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THE
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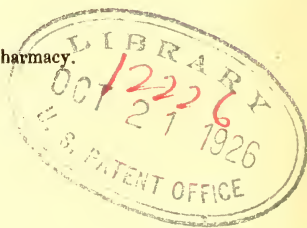
Professor of Materia Medica in the Philadelphia College of Pharmacy,

AND

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Professor of Chemistry in the Philadelphia College of Pharmacy.

NEW SERIES, VOL. X.



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THE
AMERICAN JOURNAL OF PHARMACY.

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APRIL, 1844.  
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ART. I.—REPORT OF THE COMMITTEE ON MERCURIAL
PREPARATIONS, OF THE COLLEGE OF PHARMACY,
NEW YORK.

THE standing committee of inspection, assisted by the Professor of Chemistry, and by certain members of the Board of Trustees, specially appointed to examine the various samples of mercurial ointment and blue pill mass to be found in this market, beg leave to report:—

That they collected from different venders, and not from the manufacturers themselves, the following specimens of those articles, all of which have been subjected to a rigorous examination by Mr. Lawrence Reid, Professor of Chemistry to the College, and the following results have been obtained:

1st. A specimen of mercurial ointment procured from Messrs. Rushton & Co., manufactured by Mander, Weaver & Mander, of Wolverhampton, England, imported by E. S. Inness, eight or nine months since, was found to contain *forty-six* per centum of mercury.

2d. Ointment procured from James S. Aspinwall, manufactured by George C. Close, within the last three months, was found to contain *thirty and a half* per cent. of mercury.

3d. Ointment procured from Adamson & Olliff, manufactured by George C. Close, about eight months since, and professing to be of the strength ordered by the Pharmacopoeia.

pœia of the United States, was found to contain *forty-three* per cent. of mercury.

4th. Ointment procured from Adamson & Olliff, manufactured by George C. Close, at the same time as the last specimen, and said by him to be ointment of his usual commercial strength, was found to contain *thirty* per cent. of mercury.

5th. Ointment procured from Olcott, M'Kesson & Co., manufactured by Southwick & Prior, of this city, was found to contain *twenty-one* per cent. of mercury.

The specific gravities of samples similar to the above, and indeed said to be taken from the same pots, were ascertained, at a temperature of forty degrees of Fahrenheit, in water. They were found to range from 1238 to 1900, agreeing very nearly with the relative per centages of mercury obtained by analysis from the different specimens of ointment.

It having been suggested by one of your committee, that the strength of ointment in the same jar might vary, by the general settling of the mercury, at the instance of Professor Reid three specimens were examined, samples being taken, by means of a butter-tryer, from the only three full jars to which your committee had convenient access. The instrument being passed from top to bottom, brought out a column of equal dimensions; this was divided into three equal parts, and each being separately examined, afforded the results expressed in table No. 2.

From the tendency of the mercurial ointment to settle, it would appear desirable that the vender, before dispensing it, should mix it again thoroughly from the bottom.

Eleven specimens of the blue pill mass were examined, and the following results obtained:—

No. 1. A specimen obtained from Rushton & Co., said to be manufactured by Mander, Weaver & Mander, contained *thirty-two* per cent. of mercury.

2. A specimen obtained from James S. Aspinwall, said

to be manufactured by Farr, Powers & Wrightman, of Philadelphia, contained *twenty-eight* per cent. of mercury.

3. A specimen imported by Morewood & Co., of this city, bearing the label of Davy, M'Murdo & Co., and supposed to be manufactured by them, contained *thirty-four* per cent. of mercury. This specimen appeared to be prepared with less care than any other, the mercury being less perfectly incorporated with the mass.

4. A specimen imported by Edward S. Innes, about eight months since, bearing the label of Mander, Weaver & Mander, and believed to be manufactured by them, was found to contain *thirty-three* per cent. of mercury.

5. A specimen imported by Cumming & Riach, manufactured at Edinburg, was found to contain *twenty-eight* per cent. of mercury.

6. A specimen imported by Cumming & Riach, from Messrs. Herrings, of London, contained *thirty-two* per cent. of mercury.

7. A specimen obtained from Olcott, M'Kesson & Co. manufactured by Southwick & Prior, of this city, contained *twenty* per cent. of mercury.

8. A specimen imported by Joseph A. Rea, of this city, contained *twenty-six* per cent. of mercury.

9. A specimen obtained from George D. Coggeshall, manufactured by George C. Close, several years since, contained *twenty-six* per cent. of mercury.

10. A specimen obtained from Adamson & Olliff, manufactured by Southwick & Prior, contained *twenty* per cent. of mercury.

11. A specimen obtained from Adamson & Olliff, manufactured by George C. Close, within the last three months, contained *thirty-one and a half* per cent. of mercury.

The specific gravities of these specimens of blue pill mass were taken in spirits of turpentine, but are not appended, being found to give no certain indication of the proportion of mercury contained in them.

The mercury contained in all the specimens was found to be of fair merchantable quality. Considerable difference was observed in the consistency of the various specimens of blue pill mass, but as far as the method of analysis pursued would admit, no article was found in any of the compounds which would exert an improper influence upon their medical effects.

Your committee beg leave to remark, that the variations in strength of both the above articles, offered for sale in this city, may lead to serious inconveniences in the results of their administration. But they are not inclined to attribute the deficiencies, in all cases, so much to a disposition to defraud, on the part of the manufacturers, as to a necessity imposed on them by many of the wholesale dealers, who are continually pressing them to furnish articles that may be sold at a less price than those could be which contain the full portion of the active ingredients prescribed by the Pharmacopœia. At the same time your committee wish to express the strong sense they entertain of the impropriety of sending out, for the use of the sick, preparations so discordant with the proper standard, and so insufficient in their strength. Manufacturers ought also, for their own interest, to refuse to comply with such proposals, for they must be aware, that frequently such articles are resold upon the credit of their respective names, and if one parcel should fall into hands capable of examining it, an imputation will be fixed on the maker which will not easily be effaced; or, if compelled to such a course, they ought to fix on each package an indelible mark expressing the real strength of the article therein contained.

It may not be out of place here to state, that sundry other preparations in this market are equally faulty with those already examined. Your committee particularly advert to the various Vegetable Alkaloids, Sulphuric Ether, Sweet Spirits of Nitre, Solution of Ammonia, Nitrate of Silver, and various essential oils, which are well known to be sold to

retailers at prices very far below what the cost to the maker would be, if of the requisite purity and strength. These your committee would recommend to be subjected to similar examinations, and the results made known, in hopes that an evil exerting so powerful an influence on public health and recovery from disease, may no longer baffle medical skill, and consign to neglect or oblivion medicines which have, until lately, been considered appropriate and valuable remedies.

Your committee cannot conclude without expressing their entire satisfaction with the great care, skill and perseverance which Professor Reid has evinced in conducting these very laborious examinations; for which he is, in their estimation, justly entitled to the thanks, not only of the members of this College, but to those of every one connected, in the remotest degree, with the practice of pharmacy or of medicine.

The foregoing specimens are all that your committee were able to obtain, after diligent inquiry among the venders of this city.

For the convenience of a ready examination of the results of the inquiries of your committee, and of the relative values of the different specimens, the following tables are subjoined:—

TABLE No. I.

Results of examinations of different specimens of Mercurial Ointment.

No.	PROCURED FROM	MANUFACTURED BY	PER CENT-AGE OF MERCURY.
1	Rushton & Co.	Mander, Weaver & Mander,	46
2	James S. Aspinwall.	George C. Close,	30½
3	Adamson & Olliff.	“ “ said to be of	
	“ “	U.S. Pharmacopœia strength.	43
		George C. Close, of his usual	
		commercial strength.	30
5	Olcott, McKesson & Co.	Southwick & Prior.	21

TABLE NO. II.

Results of examinations of three different specimens of Ointment, at different depths of the same jars, to ascertain the settling of the mercury therein.

No.	PROCURED FROM	MADE BY		Per cent. of mercury.	Average per centage.
1	Lawrence & Keese.	Southwick & Prior.	Upper stratum.	19.32	
2			Middle do.	20.77	
			Bottom do.	20.78	20.29
	Hull & Bowne.	George C. Close.	Upper stratum.	31.40	
			Middle do.	35.	
			Bottom do.	35.58	33.99
3	Olcott, McKesson & Co.	Southwick & Prior.	Upper stratum.	21.05	
			Middle do.	21.11	
			Bottom do.	21.62	21.26

TABLE NO. III.

Results of analysis of Blue Pill mass.

No.	PROCURED FROM	MANUFACTURED BY	PER CENT-AGE OF MERCURY.
1	Rushton & Co.	Mander, Weaver & Mander.	32
2	James S. Aspinwall.	Farr, Powers & Wrightman.	28
3	" "	Davy, Macmurdo & Co.	34
4	" "	Mander, Weaver & Mander.	33
5	Adamson & Olliff.	In Edinburg.	28
6	" "	Herrings, of London.	32
7	Olcott, McKesson & Co.	Southwick & Prior.	20
8	Adamson & Olliff.	Imported by J. A. Rea.	26
9	George D. Coggeshall.	George C. Close.	26
10	Adamson & Olliff.	Southwick & Prior.	20
11	" "	George C. Close.	31½

All which is respectfully submitted.

CONSTANTINE ADAMSON, *Chairman.*

JOHN H. CURRIE,

WM. L. RUSHTON,

LAWRENCE REID,

OLIVER HULL,

AUG. WISEMAN,

HORACE EVERETT.

New York, February 6, 1844.

NEW YORK, Feb. 13, 1844.

Gentlemen:—

In compliance with your request, I beg leave to state, that the following methods were adopted to ascertain the per centages of mercury in Blue Pill and Mercurial Ungt.

The blue pill was washed with warm water, and also alcohol, to remove such organic matters as were soluble in these fluids; it was dried until it was of the consistence of a thick paste, then mixed with an equal weight of sulphuric acid,—the whole being heated until the remaining organic matter was decomposed and carbonised; the persulphate of mercury and carbonised matter so obtained were boiled with a solution of chloride of tin, to reduce the mercury; the precipitate was washed and dried, and the mercury separated by sublimation in glass tubes.

The mercurial ointment was treated with warm water, by which means the greatest part of the lard separated, floating on the surface of the water; it was then washed with a little alcohol to remove any water attached to it, and then triturated with hot spirits of turpentine, which displaced the remaining unctuous matters; then washed with warm alcohol twice, to cleanse it from the turpentine and grease: upon drying it at a temperature of about 90° the mercury will assume the form of globules, or may be made to do so by pressing it together.

Your most obedient servant,

LAWRENCE REID.

To the Committee of the College of Pharmacy, }
New York, on Mercurial Preparations. 5

ART II.—ON OIL OF FIREWEED.

BY AUGUSTINE DUHAMEL.

Read at the Pharmaceutical Meeting, Feb. 5th, 1844.

AN oil distilled in one of the Western States, from the common fireweed plant, where it is known and much used, having been forwarded to a gentleman of this city as a remedy to cure his piles, has been handed to us for examination. A specimen is offered, for exhibition, to the College. In addition to a few observations upon some of its properties, the result of a cursory examination, a description of the plant, which is not generally known, taken from Torrey's Botanical Work, together with a dried specimen of the plant, is likewise offered.

Erethites præalta. E. hieracifolia.—Raf. Formerly the *Senecio hieracifolius* of Linnæus.—Somewhat hairy or glabrous; stem simple or paniculate above; striate-sulcate; leaves lanceolate-oblong, acute, unequally and sharply toothed or incised, tapering to the base, sessile; the upper often sagittate-auriculate [at the base, and partly clasping; involucre glabrous, subtended by small subulate-linear calyculate bracteoles; pappus copious and very white; corolla, 10-nerved; root, annual.

Habitat. Moist, waste places, Canada, and throughout the U. States; particularly abundant in recent clearings, especially in and around the spots where brushwood has been burned, whence the popular name of *fireweed*. It is a coarse weed, growing from 1 to 5 feet high, with the aspect of a *Sonchus*. It flowers from July to August.

The oil of fireweed, as presented, is in the form of a transparent greenish yellow colored fluid, with a strong penetrating herbaceous odor, and a feeble peculiar taste,

without pungency. Its spec. gr. is 0.927. It is volatile, and passes off wholly by heat. When inflamed it burns with much smoke, leaving a resinous residue. It is soluble in ether and alcohol, partially so in strong acetic acid, and only sparingly so in water.

Its principal use, thus far ascertained, has been in hemorrhoidal affections, in the dose of three drops on sugar three times a day. It does not, however, agree very well with the stomach, as experiments in two individual cases eventuated in nausea and derangement of the stomach.

ART. III.—OBSERVATIONS ON STEWART'S FORMULA
FOR HYDRARGYRUM CUM CRETA.

BY PETER LEHMAN.

Read at the Pharmaceutical Meeting, Feb. 5th, 1844.

IN the October number of the American Journal of Pharmacy, a formula for the preparation of Hydrargyrum cum Creta, was published by Mr. David Stewart, of Baltimore. In reading it over I was struck with the very large proportion of resin directed; and in order to test the matter tried it with one-half the amount there directed, and succeeded very well. I subsequently tried one-eighth of the quantity, and believe it fully adequate to extinguish the mercury in a short time. As the large quantity of resin in Mr. Stewart's process requires a proportionably large amount of alcohol for its subsequent removal, it is desirable to avoid its use. The following formula is proposed:—

Take of mercury,	-	-	-	℥iij.
resin,	-	-	-	℥vj.
prepared chalk,	-	-	-	℥v.
alcohol,	-	-	-	q. s.

Make a paste of the resin with a small quantity of the alcohol, then add the mercury, which may be extinguished in a very short time; add the chalk and alcohol gradually so as to keep up the pasty consistence, until done; then add sufficient alcohol to dissolve the resin, and wash the powder on a filter.

ART. IV.—ON ARISTOLOCHIA RETICULATA.

BY THOMAS S. WIEGAND.

A Thesis.

THE plant which forms the subject of this essay having lately been introduced into the market to a large amount, it was thought that an examination of it in comparison with the officinal article would be interesting.

ARISTOLOCHIA: *Sexual System*, GYNANDRIA hexandria.
Natural Order, Aristolochiaceæ.

Generic Character.—Calyx none. Corolla one petalled, ligulate, ventricose at base. Capsule six-celled, inferior. Willdenow.

There are many varieties of Aristolochia, as many as ten or twelve being enumerated by Dr. Wood, in the United States Dispensatory. Of all these but one has been adopted by the Pharmacopœia, and thus rendered officinal. This is the *Aristolochia serpentaria*; although there are four

varieties which indiscriminately furnish the article of commerce : these are the *Aristolochia hastata*, *hirsuta*, *reticulata* and *serpentaria*.

As this essay is designed to be a comparative examination, it is necessary to a proper comparison that both varieties be described.

A. serpentaria. This is an herbaceous plant with a perennial root, which consists of numerous small fibres, much interlaced, united to a horizontal head or caudex. Several stems often arise from the same root, and are about eight or ten inches in height: slender, round, flexuose, jointed at irregular distances; frequently of a reddish purple color at the base. The leaves are oblong, cordate, acuminate, entire, alternate, 3-nerved, supported on short petioles at the joints of the stems, and are of a pale green color.

The flowers, which are small, delicate, and purple, are supported on small peduncles and hang down, thus almost covering the flower in the earth and decayed leaves; the fruit is an hexangular capsule divided into six compartments, many-seeded. This plant is a native of Pennsylvania, New Jersey, Ohio, and Virginia. (*Wood and Bache's Dispensatory*.) It grows in light soil in forests.

It is met with in commerce in bales of one hundred pounds, of a color varying from yellow to reddish-brown, of a bitter and pungent taste, and camphoraceous odor. It is said to be adulterated sometimes with the roots of the *Panax quinquefolia* or ginseng. This must be by accident, as there could be no object for this adulteration, as the price of ginseng is equal to that of serpentaria. The roots of the *Collinsonia precox* are also used for this purpose, but this falsification is not met with in this country. The roots of the *Spigelia marilandica* are sometimes found intermixed, but the absence of the bitter taste will serve to distinguish them. In the "Dictionaire des Drogues" it is

stated that the roots of the *Asarum virginicum* are found with it.

Aristolochia reticulata.—Nutt. From a woody knotted caudex, from which numerous radicles are given off, there arise numerous short stems sometimes branched near the roots. They are slender, round, flexuose, jointed, and slightly villous in the old, but densely pubescent in the young specimens. The leaves are oblong, cordate, large, obtuse, reticulated with very prominent veins, villous on both sides, more particularly upon the veins and short petioles. The flowers are small, purplish, and densely pubescent, especially at the base and in the germ. The capsule is hexangular, deeply sulcate, sprinkled with scattered hairs, and bears at its apex the decayed corolla.—*Dr. Bridges', Amer. Jour. Pharm.* VIII., 118.

This plant is a native of Arkansas, and brought from the neighborhood of the Red River. The roots differ from those of the officinal, in the filaments being coarse and less frequently interlaced. The odor and taste the same, but stronger.

In commerce it is found in bales from one to three hundred pounds, with many of the stems and leaves intermixed, for the most part free from foreign substances. It is sometimes done up in small bundles, and in this state the filaments are much less interlaced.

The root of the *A. serpentaria* has been analysed by Bucholz, in 1820, Chevallier, in 1823, and Pischier, in 1824. The first of these obtained in one hundred parts,

Volatile oil,	-	-	-	-	.05
Extractive,	-	-	-	-	1.7
Woody fibre,	-	-	-	-	61.4
Yellow green resin,	-	-	-	-	2.85
Gummy extract,	-	-	-	-	18.1
Water,	-	-	-	-	14.59

Chevallier, whose analysis is more complete, obtained somewhat different results. His analysis is as follows:—Volatile oil, a yellow bitter principle soluble in water and in alcohol, resin, gum, fœcula, woody fibre, albumen, malic and phosphoric acids, partly combined with potassa, and a trace of iron.

The volatile oil, which is the most interesting of these ingredients, exists in very small proportion,—only half an ounce having been obtained by Grassman (*quoted by Pereira*) from one hundred pounds of the root.

The volatile oil may be obtained by distilling the root with a solution of chloride of sodium; and it comes over mixed with the water, rendering it milky. Bigelow states that this water, upon standing, deposits crystals of camphor. The oil of course has the smell and pungent taste of the root.

The succeeding experiments were designed merely to see whether the analogy, which is so striking between the congeners of this tribe, was carried out in respect to the *Aristolochia reticulata*. To do this satisfactorily, it was necessary to institute experiments on the *Aristolochia serpentaria*, as well as the *A. reticulata*.

The first series of experiments relate to the *A. serpentaria*; the second to the *A. reticulata*.

1st. An infusion was made of the strength of one ounce of the root to eight of water, by boiling for ten minutes; this yielded, upon the addition of tincture of iodine, the blue color of iodide of starch.

2d. A portion of the same infusion was filtered, and to the clear infusion a solution of the subacetate of lead was added, which produced a copious flocculent precipitate, showing the presence of gum.

3d. A cold infusion, which was made by displacement, of the strength of half an ounce of the root to eight ounces of water, yielded, upon the addition of a solution of ferro-

cyanate of potassa slightly acidulated with acetic acid, a slight cloudy precipitate, showing the presence of albumen. Resort was had to the test of ferrocyanate of potassa owing to the presence of phosphoric acid in a free state, which would prevent the usual test (the corrosive chloride of mercury) from discovering the albumen.

4th. A cold infusion was made by displacing an ounce of the root, and this was then evaporated to dryness. The gummy extract thus obtained possessed the bitter taste of the root, but in a less degree than obtained by distilling the alcohol and oil from the tincture. It was less in amount than that obtained from the tincture.

5th. The tincture was made of the strength of one of root to eight of alcohol; when water was added to the tincture it gave to it a milky appearance, indicating the presence of resin; but this was not satisfactory, as the presence of oil would also produce the same effect: it therefore became necessary to prove to which of these, or whether to both, this was owing. This state of things made the succeeding experiment necessary.

6th. A tincture was made by displacing one ounce of the root with alcohol; this was then distilled to remove the volatile oil and alcohol: this was continued until it was of such consistence as to render its removal from the retort necessary, when there was left behind a reddish or yellowish-brown resin of tough and sticky consistence, possessed of a bitter and pungent taste,—the latter owing to a portion of the volatile oil which remained.

7th. A portion of the root was placed in a copper still, and covered with a solution of chloride of sodium; this was then boiled, and the water which was distilled over not being so milky as was desirable, it was submitted to the operation again with but little better success; the water had the smell and warm taste of the root,—the smell being much stronger than the taste.

8th. Some of the root was incinerated, and the ashes thrown into water, so that any potassa which was present might be dissolved out: to this solution dilute nitric acid was added and then evaporated to dryness. Crystals possessing the taste of nitrate of potassa were obtained.

1st. An infusion of *Aristolochia reticulata* was made, of the same strength as that of the *Aristolochia serpentaria*, and yielded, when the tincture was added, the blue color of iodide of starch.

2d. The same infusion was filtered, and on having the solution of subacetate of lead added to it, gave the same precipitate as the *Aristolochia serpentaria*, but rather more abundant.

3d. A cold infusion was made by displacement, of the strength of half an ounce of the root to eight ounces of water; this yielded, when an acidulated solution of ferrocyanate of potassa was added, a slight precipitate upon standing over night.

4th. A cold infusion was made by displacing an ounce of the root, and then evaporated to dryness. The gummy extract thus obtained was possessed of the bitterness of the root, but less so than that obtained from the tincture by the distillation of the alcohol and oil. It was greater in amount than that obtained from the *Aristolochia serpentaria*.

5th. The tincture was made of the strength of one ounce of the root to eight ounces of alcohol; and when water was added to this, a milkiess similar to that observed in the *Aristolochia serpentaria* was visible; but this, for the reason before given, was not to be relied on, and consequently the following experiment became necessary.

6th. A tincture was made by displacing an ounce of the root with alcohol; it was then placed in a retort, and the alcohol and oil distilled off; a resin was obtained having the same color and taste as that obtained from the *Aristolochia serpentaria*; not so much in amount, but of firmer

consistence. It was greater in amount and possessed of the taste and smell of the root more strongly than the residuum left from the evaporation of the infusion by displacement with water.

7th. The roots of the *Aristolochia reticulata* were placed in a copper still and covered with a solution of chloride of sodium; this was then subjected to heat until the root was deprived of the warm pungent taste so peculiar to it, thus denoting an absence of the oil: the water which passed over was rendered milky, and upon its surface globules of oil were seen floating; the oil was of a greenish-yellow color, and possessed the odor and pungent taste of the root in a high degree. The amount of oil was so small that it was impossible to obtain it in a separate state.

8th. A portion of the root was incinerated, and the ashes obtained were placed in water, so that any potassa which was present might be solved out; the solution was filtered, and to the clear liquor dilute nitric acid was added; this was then evaporated to dryness, when there was left a number of crystals possessing the taste of nitrate of potassa.

We may, from the foregoing experiments, state the constituents of these two roots to be the same; the only difference being in the amounts of the various principles they contain: thus, gum, extractive matter, and volatile oil are contained in greater amount in the roots of the *Aristolochia reticulata* than in those of the officinal article.

In the amount of the volatile oil which the roots of the *Aristolochia reticulata* contain, the most marked difference in chemical composition exists; and it is rather a subject of congratulation that as, the supply of the officinal article has failed, that article which is sold as a substitute is not only equal but even superior to that which it is to replace.

The sixth experiment of the *Aristolachia reticulata*, and the fourth of the *Aristolochia serpentaria*, show us that the tincture is the preferable form of exhibition, as it contains all the active principles of the root in solution. This last remark will apply when the full effects of the medicine are desired, as the infusion is the form of exhibition preferred by Pereira.

ART. V.—REMARKS ON COLD CREAM.

BY LAWRENCE TURNBULL.

Read at the Pharmaceutical Meeting, February 5th, 1844.

Take of white wax,	-	-	3j.
oil of almonds,	-	-	f3iv.
rose water,	-	-	f3ii.
borax,	-	-	3ss.
oil of roses,	-	-	Mv.

Let the wax be dissolved in the oil of almonds by a gentle heat, so as not to change it; then dissolve the borax in the rose water, and add the solution to the heated oil, stirring constantly until perfectly cool; then add the oil of roses, stirring it a little longer. If properly prepared it yields a beautiful preparation of a snow-white color, and without any appearance of granulations. The borax unites to form with the oil a mild and bland compound, by chemical union.

ART. VI.—FORMULA FOR THE PREPARATION OF SYRUP OF CHAMOMILE.

Presented to the Pharmaceutical Meeting, February 5th, 1844.

BY EDWARD PARRISH:

Take of chamomile flowers in coarse powder, one ounce.

“ cold water, twelve fluid ounces.

“ refined sugar, in coarse powder, twenty ounces.

Make an infusion, by the displacement process, of the chamomile flowers and water. Remove the residue from the apparatus, and place the coarsely powdered sugar in its stead : on this pour the infusion until it is entirely dissolved.

The dose might be stated at a table spoonful.

ART. VII.—ON EXTRACTS OF SPIGELIA.

BY THOMAS ESTLACK.

Extract from Thesis.

A CLASS of pharmaceutical remedies has of late been introduced into this country, designated fluid extracts. Preparations of a similar character have long been in use in England, under the name of concentrated essences, and concentrated infusions, which appear to be similar in character to our fluid extracts, with the exception of containing less sugar, and, of course, being of thinner consistence. The

directions which accompany these essences, indicate that one part to seven is requisite to form a portion of the ordinary strength of a decoction.

The difference between our climate and theirs may account for the necessity of our using a greater quantity of saccharine matter for the preservation of the fluid extract.

Every improvement which can be made in the mode of administering remedies, by diminishing the dose, and rendering that palatable which was before nauseous and disagreeable, is some contribution to the general stock of knowledge. The fluid extracts may unquestionably be valuable remedial agents, when properly prepared; and if some of those who first introduced them to notice, had not chosen to conceal their ingredients under the comprehensive title of compounds, as well as their mode of preparation, the charge of empiricism and quackery would no doubt have been spared, and the preparations would have claimed the confidence of physicians; as is the case with the fluid extracts of Sarsaparilla, Senna, &c., since the publication of formulas. It is not unusual for the apothecary to find himself constrained either to vend remedies thus introduced, involved in mystery as to their composition, or to institute experiments, and, by the application of correct pharmaceutical principles, to endeavor to obtain a remedy which shall be entitled to the confidence of the physician.

The *Spigelia Marilandica* has long been ranked as one of the best vermifuges introduced. The worm tea of the shops—notwithstanding the quantity necessary to be taken renders it objectionable—enjoys still a confidence which the numerous substitutes have not been able to destroy.

The Compound Fluid Extract of *Spigelia* supplies this defect, and affords at once an active and safe remedy, combined with uniformity of strength and pleasantness of taste.

The following is the formula which I propose for its preparation, viz.:

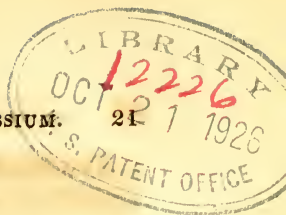
R. Rad. Spigeliæ Contus.	℥iv.
Sennæ Alexandriæ,	℥iij.
Fol. Sabinæ,	℥j.
Mannæ,	℥j.
Sacch. Alb.	℥viij.
Alcoholis,	Oss.
Aquæ Bullient.	Oij.

Upon the spigelia, senna, and sabina, finely bruised, pour the boiling water, and cover over until cool. Then add the alcohol, and set it aside to macerate for 24 hours; transfer to a displacement filter, and having displaced the tincture, carefully evaporate, at a low heat, to f.℥xii., in which dissolve the sugar and manna, and again evaporate to Oj. Each fluid ounce will contain the strength of ℥ij. of spigelia, and ℥iss. of senna. A teaspoonful will represent 15 grains of spigelia, which is the medium dose for a child from eight to twelve years of age.

The omission of the sabina might, by some, be esteemed an improvement. The quantity, however, is small, and it can do no injury.

The solid extract is prepared from the decoction; the strength of which may be known by its sensible properties. As it is desirable to obtain this as strong as possible, and as great heat has a tendency to injure the extract, it should be evaporated, by means of a water-bath, to such a consistence as to form a firm pill mass when cold. Thus prepared, it is of a deep brown or black color, and has the bitter taste and smell of pink root. In order that it may keep well, it should be placed in porcelain jars, and protected from the air.

To be given in form of pills, of five grains each; dose, three pills, to be taken one hour before each meal, to be repeated for several days, and followed by a dose of senna and manna.



ART. VIII.—SOME EXPERIMENTS UPON THE REACTION
THAT TAKES PLACE BETWEEN THE SULPHATES OF
SOME OF THE ORGANIC ALKALIES AND IODIDE OF
POTASSIUM.

By S. LEWIS, M. D. AND THOMAS J. HUSBAND.

SIXTY grains of the sulphate of quinia and an equal quantity of the iodide of potassium were thrown into four ounces of boiling water, and boiled for a few minutes. A tenacious substance was immediately formed, and floated on the surface of the liquid; this was collected and the remainder set aside. When cold, there was a further coating of the above matter on the surface of the fluid, and some deposited, also, on the sides and bottom of the vessel. This substance was carefully washed and dried by a gentle heat; it weighed fifty-four grains, and presented the following characteristics:—It has an extremely bitter taste, is of a light straw color, uncrystallizable, very soluble in alcohol and ether, cold water dissolves it sparingly, soluble in about forty parts of boiling water.

To ascertain the changes that had taken place, the remaining liquor was evaporated to dryness, and treated with several successive portions of absolute alcohol. The undissolved portion, when collected and examined, proved to be the sulphate of potassa, and weighed twelve grains. The alcoholic solution, being non-concentrated by evaporation, deposited a considerable quantity of saline matter and iodide of potassium. The evaporation continued to dryness, and the dry matter treated with water, and this evaporated to dryness, yielded a further portion of iodide of potassium; the whole weighing thirty-three grains. What remained after this last treatment with water presented the

same properties as the first product, weighing three grains, which, added to that, made fifty-seven grains.

From these results it is quite apparent that a perfect decomposition of the sulphate of quinia and a *part* of the iodide of potassium took place, resulting in an hydriodate of quinia and sulphate of potassa. The excess of iodide of potassium in the solution is found requisite for the success of the process, as a perfect decomposition of the sulphate of quinia did not take place when only the quantity indicated by the equivalents were used.

In further proof of the formation of the hydriodate of quinia, it was treated with acidulous sulphuric ether and exposed, to favor evaporation, when iodine was set free and deposited on the upper part of the vessel, and a flocculent precipitate of the sulphate of quinia appeared in the ether. It is decomposed by the strong and dilute mineral acids setting the iodine free, as shown by the starch test. Similar combinations were formed by means of the sulphates of morphia and veratria. The former is in very delicate, white, feathery crystals, and the latter in transparent yellowish scales. All of these salts are affected by exposure to the direct rays of the sun, the iodine being slowly evolved.

The composition of the hydriodate of quinia may be inferred, from what has been said, to be a dihydriodate. Thus, sixty grains of sulphate of quinia, being about the one-seventh of its equivalent, would require one-seventh of an equivalent of iodide of potassium, or about twenty-four grains, to enable the hydriodic acid to replace the sulphuric. As no free potassa or quinia was found in the solution, it follows that the whole of the potassium and sulphuric acid must have left their original combinations, yielding twelve grains, or about one-seventh of an equivalent of sulphate of potassa; the hydriodic acid and quinia pre-

serving the same relative proportions as in the sulphate of quinia, *i. e.* one of acid and two of quinia.

To ascertain whether a monohydriodate of quinia could be formed, the following experiment was performed at the suggestion of our friend Professor Bache,—one-fortieth part of the combining proportions of the substances being used; thus, disulphate of quinia, eleven grains; sulphuric acid, one grain, ($\frac{9}{40}$ ths;) water, an ounce, were boiled several minutes. Litmus paper showed the presence of free acid. To this was added iodide of potassium, eight grains and a half, and boiled again. When cold, hydriodate of quinia, as a tenacious mass, was deposited on the sides and bottom of the vessel. The mother water, still having an acid reaction, being poured off and evaporated to dryness, and treated with absolute alcohol, left undissolved a portion of sulphate of potassa. The alcoholic solution, evaporated to dryness, yielded several grains of iodide of potassium. Although the relative proportions in this experiment were such as to neutralize each other and produce a mono-salt of quinia, the undecomposed iodide of potassium obtained from the solution proves that the two equivalents of quinia in the sulphate united with but one equivalent of hydriodic acid derived from the iodide of potassium,—the free sulphuric acid still remaining uncombined.

ART. IX.—THE ELAÏOMETER.

(An Instrument for detecting the Adulteration of Olive Oil.)

By M. GOBEL.

THE price of olive oil is sufficiently high to lead to its admixture with cheaper oils. The oil of poppy-seeds is that which is usually employed for this adulteration, as it has the advantages of being cheap, of having a sweet taste, and very little smell.

Several methods have been proposed for detecting this fraud. Messrs. Soubeiran and Blondeau, who tried all the different processes for this purpose, found that the method founded on the difference in the degrees of viscosity in olive oil and oil of poppy-seeds, and the method of Poutet, afforded the most certain indications as to the purity of olive oil.

The first of these processes consists, as is known, in putting the suspected oil into a bottle, and introducing bubbles of air into the oil by shaking the bottle. When the olive oil is pure, the bubbles disappear as they rise to the surface of the liquid; whereas they continue for some time if the oil be mixed with oil of poppy seeds. But this method can only be applied in cases where at least a tenth part of poppy oil has been added.

Poutet's process consists in mixing the oil with a twelfth of its weight of a solution of mercury, made in the proportion of six parts of mercury to seven and a half parts of nitric acid, sp. gr. 1.35; the solution of the mercury is allowed to take place spontaneously, and is then used immediately. The mixture should be shaken every ten minutes during a period of two hours; it is then to be put into a cold cellar, and in twenty-four hours afterwards its

consistence is to be observed. Messrs. Soubeiran and Blondeau recommend, in estimating the consistence of the solidified oil, to strike its surface with a glass rod; and they apply the term *sonorously firm* to oil which becomes sufficiently solidified to afford a manifest sound, on percussion; they apply also the terms *firm, rather firm*, having *the consistence of suet, soft consistence, the consistence of congealed oil*, to those samples of oil which acquire a consistence more or less solid.

By neither of these methods is it possible to determine with certainty the presence of poppy oil in oil of olives, unless the sample contain at least one-tenth of the former.

Of these two processes, that of Poutet is undoubtedly the best; and yet this, according to the above named chemists, is, in many respects, deficient. Thus, not only does it fail to determine the proportions in which the two oils may be mixed, but it offers the great inconvenience of requiring the employment of a re-agent immediately after it has been prepared, of occupying a considerable length of time, and of requiring a certain expertness of manipulation; for the solution of the mercury in nitric acid, resulting from the spontaneous action of these two bodies, is not so uniform in its composition as to ensure always the same effect. This re-agent sometimes fails to produce the expected effect, and it is remarkable that when this takes place, the solution does not crystallize after standing for a day. Messrs. Soubeiran and Blondeau recommend that no account should be taken of the experiments, if the remainder of the solution which has not been used is found not to have crystallized; and in all cases to repeat the process so as to guard against errors.

My process is performed in a very much shorter time than that of Poutet; it usually occupies only a quarter of an hour. It affords indications of the smallest quantity of

oil of poppy seeds when mixed with olive oil, and of the proportions in which these two are present.

This process consists in the use of an instrument which I have called the *elaïometer*, the construction of which is founded on the difference between the densities of olive oil and oil of poppies. This instrument is an *areometer*, having a large bulb surmounted by a very small tube. In consequence of this construction, the instrument is one of extreme sensibility. It is graduated so that at a temperature 10° Reaumer, or 12.5° C. (55° Fahr.) it rises to 0 in pure oil of poppy-seeds, this being the greatest density indicated; and to 50 in pure olive oil, this being the least density indicated. The interval between 0 and 50 is divided into fifty equal parts. The 0 is marked at the bottom of the stem, and the 50 at the top.

I have graduated the instrument at a temperature of 55° Fahr., because this is the usual temperature of the cellars in which the oil is kept.

If, on immersing the instrument at 55° Fahr., the stem sinks to the point marked 50, it may be inferred that the oil is pure; but if, on the other hand, it does not reach this point, the inference will be that the oil is mixed.

If the instrument stands at 40, this number multiplied by two, will give the quantity of pure olive oil present in 100 parts; the sample, in this case, being mixed with twenty per cent of oil of poppy-seeds. In like manner, any other number below 50, at which the instrument floats, will, by the same process, indicate the amount of adulteration.—*Lond. Pharm. Jour.*, from *Jour. de Pharm.*

ART. X.—ON THE SOLUBILITY AND SOME OTHER PROPERTIES OF SULPHATE OF POTASH.

By Mr. THEOPHILUS REDWOOD.

THE recent case of poisoning with sulphate of potash, has caused the attention of medical men and others to be directed to the medicinal effects and chemical properties of this salt. The subject was noticed at the last evening meeting of this Society, and several communications respecting it have appeared in the journals within the last few weeks. The deleterious effects which have sometimes ensued on administering the salt in doses of two drachms or more, have been ascribed, by some persons, to its sparing solubility; by others, to this—in connexion with the angular form of the particles of which it consists, when reduced to powder.

Authors differ materially with regard to the extent of solubility of sulphate of potash in water. According to Turner and Phillips, it requires sixteen parts of water for its solution at 60° ; Brande says, sixteen parts of cold water; Murray, seventeen parts of water, at 60° ; while Gay Lussac, whose statement appears to be adopted by Graham and Kane, describes it as soluble in nine parts of water, at 60° Fahr.

It was mentioned in this room by Mr. Gallard, at our last meeting, that the solubility of sulphate of potash in water, may be increased by the addition of a portion of sesquicarbonate of soda—a circumstance which was at the same time ascribed to the formation of new salts in the solution. The correctness of this fact and its explanation has, however, been since denied in a letter published in the Medical Gazette of October 27th, by Mr. Mowbray, who says, that sulphate of potash is not more soluble in solution

of carbonate of soda than in distilled water; he also observes, that "every chemist will smile when he is informed that sulphate of potash might be decomposed by carbonate of soda."

The opinions thus expressed are so much at variance, and the experiments by which the questions at issue may be determined, are so simple and easy of execution, that there would be no excuse for our remaining in doubt with regard to them, especially as they are considered to have some bearing upon the safety of the administration of a somewhat popular remedy. Moreover, it is desirable that every pharmacist should be capable of determining points of this description, both for his own satisfaction and for the information of others. I propose, therefore, in giving the result of my experiments, to describe the manner in which they were performed, and to point out the precautions which are necessary in order to arrive at correct results.

The specimen of sulphate of potash employed in these experiments, was in well-defined crystals, which formed a clear solution in water. This solution was neutral to litmus paper; and, on being tested with sulphuretted hydrogen, nitrate of silver, and the usual tests for the presence of nitrates, afforded no indications of impurity.

Exp. 1.—To determine the degree of solubility of this salt, a portion of it was reduced to fine powder, and sixty grains of this was put into a vial, furnished with a good cork. This was now accurately counterpoised in the balance. A pneumatic trough, containing about a gallon of water, at a temperature of 60° Fahr., was provided, and this water was kept constantly at the same temperature. Distilled water was now added to the salt contained in the vial, the solution of which was promoted by agitation, while the temperature was regulated by [the immersion of the bottle in the pneumatic trough. When the salt was

nearly all dissolved, the further additions of distilled water were made very gradually, and care was taken to preserve the temperature precisely at 60° . The solution being completed, the vial with its contents was weighed, and it was found that 698 grains of water had been added to the salt.

Exp. 2.—A similar quantity (60 grains) of the same specimen of sulphate of potash, was put into another vial, together with thirty grains of sesquicarbonate of soda. The solution of these salts was effected in the same manner as in the previous case; and it was found that 528 grains only of water was required for the solution.

Exp. 3.—Into another vial was put 60 grains of sulphate of potash and 30 grains of bicarbonate of potash; and, the solution being effected as before, 805 grains of water was found to have been required for that purpose.

Exp. 4.—On dissolving 30 grains of the specimen of sesquicarbonate of soda, used as above, it was found to require 352 grains of water for its solution; and the same quantity of the bicarbonate of potash took 105 grains of water for its solution.

In all these cases a period of six hours was occupied in effecting the solution.

Thus, then, it, appears, that in operating as described above, one part of sulphate of potash requires 11.63 parts of water for its solution at 60° ; whereas, one part of sulphate of potash, mixed with half its weight of sesquicarbonate of soda, is soluble in 8.74 parts of water at the same temperature. It appears also that whilst the presence of sesquicarbonate of soda increases the solubility of sulphate of potash, a contrary effect is produced by the presence of bicarbonate of potash, the same amount of water being necessary in the latter case, as the two salts would require for their solution separately.

The state of aggregation of sulphate of potash appears to influence its solution very considerably.

Exp. 5.—On adding one part of sulphate of potash in crystals to fourteen parts of water, kept at a temperature of 60° , the solution was not effected in three days, although the vial was frequently agitated; and it was found necessary to add two more parts of water to complete the solution. This fact will probably account for the statement of some Chemists, that sulphate of potash requires sixteen parts of water for its solution.

Exp. 6.—Considerably more sulphate of potash, *in powder*, was added to distilled water, than the latter was capable of dissolving. After keeping the mixture for several hours at 60° , the solution was found to contain one part of salt to 9.5 parts of water. This very nearly accords with Gay-Lussac's statement.

The difference between the results in *Exp. 1* and *Exp. 6* appears to arise from the fact, that the particles of which the powdered sulphate of potash consists, are not all of equal dimensions. On adding a portion of this powder to water, as in *Exp. 1*, the smaller particles are first dissolved, and when the solution has nearly attained its point of saturation, the solvent power of the liquid becomes incapable of overcoming the molecular attraction of the remaining particles. This solution, however, although incapable of dissolving the larger particles, would still take up a farther quantity of the salt in a state of minuter division, as occurs in *Exp. 6*.

There can be no doubt, I presume, that the increased solubility of sulphate of potash when mixed with sesquicarbonate of soda, arises from the partial decomposition of these two salts, which is quite in accordance with what occurs in many analogous cases. Thus, it has been found, as noticed by Mr. Richard Phillips, that sulphate of barytes may be decomposed by carbonate of potash. Sulphate of strontian is also subject to a similar decomposition.

When two salts, having different acids and bases, are mixed in solution, a partial decomposition of each is frequently effected, so that four salts instead of two will be present. Some Chemists, as Berthollet, have considered that this partition of acids and bases takes place in all cases where salts in solution are mixed ; but of this there is no sufficient evidence. Changes of color and changes of solubility are almost the only means we have of determining the point ; so that every fresh observation, with reference to these effects, is so far of importance.

That decompositions are effected in sulphate of potash, as well as in other salts, in opposition to what is conceived to be the prevailing power of affinity, is certain. Thus, on digesting sulphate of potash in nitric acid, with a slight degree of heat, nitrate of potash is obtained ; and yet sulphuric acid, under other circumstances, expels nitric acid from its combination with potash. Hydrochloric acid is also capable of decomposing sulphate of potash ; and even tartaric acid, if added to a concentrated solution of sulphate of potash, is precipitated in the form of bitartrate of potash. In these cases the decomposition is only partial ; so also is that which takes place on adding carbonate of soda to sulphate of potash. In the latter case, sulphate of soda and carbonate of potash are formed to a certain extent ; and as sulphate of soda is more soluble than sulphate of potash, the solution of the latter will be promoted by the admixture of carbonate of soda, in proportion to the greater solubility of the newly-formed salts, and to the extent to which double decomposition takes place.

London Pharm. Journal.

ART. XI.—ON THE GALLS OF TEREBINTHUS AND PISTACIA. By M. GUIBOURT, Professeur de l'Ecole de Pharmacie, Paris.

IN the circuit of the medical jury of the department of Eure, made by M. Ledanois in conjunction with MM. Richard and Gonillart, a pharmacien of Bourghéroutle presented to the jury a substance, the nature and origin of which he was ignorant of, having found it in the stock of his predecessor. This substance, which was broken, had the appearance of a fragment of a dried pericarp. The color was reddish grey, it had no odor, but a very astringent taste. M. Ledanois analysed it, and found its composition to be as follows :—

Gallic Acid	-	-	-	-	15
Tannic Acid or Tannin	-	-	-	-	60
Soft Resin or Turpentine	-	-	-	-	4
Caoutchouc	-	-	-	-	1
Inert residue	-	-	-	-	20
					<hr/>
					100

A portion of this substance having been sent me by M. Ledanois, I replied at first that it resembled the gall of the terebinth, mentioned by certain ancient authors, but having found in my own stock two other analogous galls, one of which coincides better with the gall of the terebinth, I think it right to recapitulate here the short descriptions which have been given of this substance, to describe the characters of that which I possess, and to request those persons who may have a better opportunity of identifying its origin, to publish the information in a scientific journal.

We find in the *Observations* of Lobel (page 538, fig. 2,) in the *History of Rare Plants*, by Clusius (page 15,) and

in the *History of Plants*, by Bauhin (lib. iii, page 279,) one only and the same figure of the terebinth (*Pistacia Terebinthus*,) having, at the extremity of the branch, a gall formed like a horn, lengthened and contorted, which so exactly represents one which I possess, that the origin of this appears to be well defined; but this gall is not the one found with the pharmacien of Bourghéroulde. This horn-shaped gall, however, is not the only one which the terebinth can produce, for Clusius himself mentions another *vesicular* one, adhering to the leaves and to the branches, nearly similar to that of the leaves of the elm. Again, J. Bauhin mentions having observed frequently on the terebinth an excrescence similar to a leathern bottle (*outré*), like that of the elm, and at other times, at the extremity of the branches, reddish horns from four to six inches long, of a cartilaginous substance, and containing a viscid humour, in which are contained small aphides (*pucerons*.)

According to the monks, editors of Mésuë, the terebinth bears two different fruits, and probably three. The first does not ripen, the second is developed in bunches, and becomes larger than that of the lentisc. The last, if we may be allowed to give it this name (we allude to the galls,) is constituted like the bladders of the elm, though different in form and color, for the former are lengthened, depressed, and in the form of a goat's horn, whence the tree has taken the name of *cornucapra*; the latter are round like apples, or oblong like plums, and of all these varieties, some are partly white, partly red, others are lemon-colored and white, others, again, greenish. All, when ripe, are filled with aphides (*pucerons*.)

According to Bélon, the peasants of Thrace and Macedonia collect the galls of the terebinth about the end of June, under the leaves or at the foot of the branches which bear the fruit, and there they find a small gall the size of a hazel nut, which, if allowed to grow, would become long like a

small horn, but they gather it while very small, and sell it at a high price to dye fine silks in the town of Pruse (*Singulariter*, book i., c. 65.) They use annually above 6000 pounds of these galls. They are hollow within, of the size of small Roman galls, growing on the leaves of the male terebinth. When they are not gathered, they grow half a foot long, and horn-shaped (*ibid.* book iii., c. 49.) Bélon, as it would appear, believes that all the galls of terebinth form one species, and that they only differ from their age; but it is probable, as is the case with the galls of the oak, that different parts of the terebinth may be impregnated by different insects, and produce galls quite distinct. I do not pretend to conclude from this that the three galls which I possess are due to the terebinth. I believe them, on the contrary, to be produced by a different tree.

Lobel, whom I have already quoted, has published two other figures of *Pistacias*, with horn-shaped galls. One of these (*Observations*, page 539,) borrowed from Dodonæus, is given as a pistacia, and the gall in fact resembles that of the pistacia, but the tree appears to me to be a *Terebinthus*. The other figure, much better done, is found in the *Adversaria*, p. 12. This tree is a true pistacia (*Pistacia narbonensis*, L.) bearing two sorts of galls, one in the form of a spindle, nearly straight and lengthened to a point at the extremity; the other, short, angular, rounded, and double. The spindle-shaped or horn-shaped gall, is very probably the second sort which I have to describe, and the small double gall is perhaps the young state of the third sort to which belong the galls of the pharmacien of Bourgthéroulde. After having thus established, as far as it is possible, the origin of these three galls, I proceed to describe them.

1st sort: Horn-shaped Gall of the Terebinthus.—Represented in the *Observations* of Lobel, page 538, and in the *History of Rare Plants*, by Clusius, page 15. This gall has the form of a long and flattened vesicle, enlarged at

the middle, and tapering to a point at each extremity. It is generally folded back upon itself, near the peduncle, and often bent in the contrary direction, near the opposite points, so that the gall is *bistorte* (twice bent.) I possess one specimen entire, 7 centimetres long, by 17 millimetres broad, and several large specimens not entire, from 30 to 35 millimetres broad, the length of which might have been from 16 to 18 centimetres. This gall has a decided red color, especially externally, it is pretty regularly striated longitudinally, *smooth*, only a millimetre thick, and empty internally, except a small quantity of the exuviae of insects. The substance of the gall is compact, rather translucent, mixed with white woody fibres, which reach from one extremity to the other. It is loaded with a resinous juice, which exudes in places outside or inside. It has a very astringent taste, slightly aromatic, similar to Chio turpentine, and this character is so manifest, that it is sufficient to prove that the gall in question belongs to the genus *Terebinthus*. Lastly, it must be observed, that this gall, being formed by a puncture on a terminal bud, is always simple and terminated by a single point.

2d sort: Horn-shaped Gall of the Pistacia.—This gall appears to me to be represented in the *Adversaria* of Lobel, page 412. It is from 4 to 6 centimetres in length, from 8 to 15 millimetres in breadth, more or less bent, and terminated by a sharp point. It is tortuous in its length: it is covered with a dark grey epidermis, and has sometimes on its surface small flat and circular glands, from which a yellow resin exudes. The substance of the gall is quite black, light, fragile, and from $\frac{1}{3}$ to $\frac{1}{2}$ a millimetre thick. The taste is simply mucilaginous with an aromatic flavor. This gall is entirely without astringency.

3d sort. Cauliflower-gall.—Before receiving the specimen from M. Ledanois, I possessed an entire gall and a fragment of this sort, which must result from the monstrous de-

velopment of a flowering bud, still retaining at its base vestiges of scales impregnated with a resinous juice. From the base, the pierced bud appeared to divide into three or four branches, each bearing a gall; but of these galls there only remain one entire, and a portion of a second. The entire gall, in rising from the peduncle, is enlarged rapidly into a fan-shape, and separates itself near the middle in two unequal parts, on which are prominent points indicating other divisions less marked, or more completely merged and confounded. The greatest length of the gall is forty-seven millimetres, and its maximum breadth thirty-two. This gall, when fresh, must have been covered with a yellowish down, which remains in the hollow places, while the prominent parts have become brown and polished by friction. The substance of the gall is rather more than a millimetre in thickness, whitish, and translucent in its fracture, and so compact and gorged with juice, that it presents, when cut, the appearance of a dried gum-resin. It has no reticulated exudation, and possesses a very astringent taste, without any resinous flavor or smell.

The gall fragment, which was sent me by M. Ledanois, only differs from that which I have just described, by its uniform dull greyish-red colour. It has the same yellowish down on the exterior—the same compact, translucent, and whitish substance within, and the same astringency, without aromatic or resinous taste. Some small entire galls which are with it, resemble the small angular excrescences in the figure of Lobel (*Adversaria*, p. 412;) however, they differ from the black horn-shaped gall above described (the 2d sort.)

It is evident that this third gall is the most important of the three, from the large proportion of tannin which M. Ledanois has found in it. It is to be regretted that it is so rare, and so little known.

Idib.

ART. XII. ON THE BEHAVIOUR OF THE ANTIMONIATE OF POTASH TOWARDS THE EARTHS.

By M. WACKENRODER.

FROM my examination of the applicability of antimoniate of potash as a test for soda, I was led to investigate its behaviour towards the alkaline earths, and also towards albumina; since from the frequent occurrence of the three latter bases in salts of potash and soda, the value of the antimoniate of potash as a test would be considerably diminished, if we remained unacquainted with its behaviour towards salts containing these earths.

The following are the results of my experiments. I need only add that the strength of the solutions were the same as employed in my former investigation.

Salts of Barytes.—Antimoniate of potash produces, in a solution of chloride of barium, a white, voluminous, flocculent precipitate of antimoniate of barytes, which does not alter its state of aggregation even after long standing. When the solution of the chloride of barium is very much diluted, the antimoniate of potash still causes a flocculent sediment; but the precipitate only forms on the addition of a sufficient quantity of the potash salt, from the antimoniate of barytes being soluble in an excess of chloride of barium. This clear solution deposits very few or no flakes within twenty-four hours, but there separates on the surface a small pellicle of a salt, which consists of roundish, adherent granules resembling fish-roe. It would therefore appear that this pellicle is produced by the carbonic acid of the atmosphere, and is consequently merely accessory.

Salts of Strontia.—Antimoniate of potash behaves towards a solution of chloride of strontium in nearly the same manner as towards chloride of barium. However, with a certain concentration of the liquid, and a certain addition

of antimoniate of potash, there is formed in the voluminous precipitate an acicular salt, which appears under a magnifying power of 200 times to consist of fasciculi and tissue of needles. After long standing there is also formed on the surface of the liquid a fine crystalline pellicle, and some larger sandy granules are deposited on the sides of the test-tube. These larger granules appear under the microscope to have no crystalline surfaces, but to be formed quite distinctly of *concentric layers*. The flocculent precipitate dissolves readily in excess of dilute chloride of strontium; the liquid is nearly perfectly clear, and only deposits a few flakes after long standing, but a pellicle forms on the surface.

The aqueous solution of the sulphate of strontia is rendered opaque by antimoniate of potash; after some time there is a slight flocculent precipitate, and a deposition of the above-mentioned minute granules on the sides of the test-tube. The precipitation of strontia by antimoniate of potash is one of the best means of detecting this alkaline earth.

Salts of Lime.—Antimoniate of potash immediately produces in a solution of chloride of calcium a voluminous flocculent precipitate, which does not become crystalline, and which redissolves to an almost clear solution in an excess of chloride of calcium. Very few flakes are deposited from this solution on its being allowed to stand exposed to the air, but a pellicle of minute crystals forms on its surface, which consists probably of biantimoniate of lime. It results hence that when only a little of the test is added to a dilute solution of chloride of calcium there is no flocculent deposit; but with a sufficient quantity of antimoniate of potash, even when the solution of the lime-salt is excessively dilute, there is a turbidness, and subsequently a flocculent precipitate, so that it would almost appear as if the sensitiveness of oxalate of potash towards salts of lime was even surpassed by that of the antimoniate of potash.

The aqueous solution of the sulphate of lime affords, immediately on the addition of antimoniate of potash, a voluminous flocculent precipitate, which undergoes no change in its state of aggregation even after long standing. The liquid deposits no crystals. The smallest quantity of lime in salts of potash, especially in the carbonate of potash, may be detected instantly by the antimoniate of potash from the opacity produced.

Salts of Magnesia.—Magnesia is thrown down from the aqueous solution of its salts, especially from that of the sulphate of magnesia, in a voluminous and flocculent state by the antimoniate of potash. The antimoniate of magnesia redissolves to an almost clear solution in an excess of sulphate of magnesia, but a few white flakes generally separate after standing. On this account no flocculent precipitate is produced in very dilute solutions of magnesia, except when a sufficient quantity of the test is employed; small quantities of magnesia are easily overlooked even when the solution is but moderately dilute. Frequently, however, a crystalline opacity results on agitating the liquid which might easily be confounded with that which is formed with salts of soda; when the solution is excessively dilute, so that no precipitate results on the addition of the test, small crystals are deposited within twenty-four hours in considerable quantity.

The crystals appear to be the neutral salt, since they do not form in an aqueous solution of carbonate of potash to which a small quantity of sulphate of magnesia has been added. Such a solution affords with antimoniate of potash a flocculent precipitate similar to the antimoniate of lime. The crystals are nearly insoluble in pure water, and but very slightly soluble in a cold dilute solution of carbonate of potash, sulphuret of ammonium, and sulphuret of potassium; they are rapidly decomposed by muriatic acid. Tersulphuret of antimony is therefore immediately produced when

some alkaline sulphuret is poured on them, and an excess of muriatic acid is added.

The primitive form of the crystals is that of an oblique rhombic prism. When the crystals are allowed to form slowly in a moderately dilute solution of pure sulphate of magnesia, they are perfectly developed, and form a sandy powder of vitreous lustre, the prismatic form of which can easily be detected with the assistance of a good lens. Magnified 200 times, and with a good light, they appear perfectly transparent, well-defined crystals, which refract the light very powerfully. It will always be necessary to attend carefully to the crystalline form of the antimoniate of magnesia, when employing the antimoniate of potash as a test for soda; or else to assure oneself of the total absence of lime and of magnesia in a liquid by oxalate of potash and by basic phosphate of ammonia.

It should always be borne in mind, that on mixing the antimoniate of potash with salts of ammonia, precipitation takes place. A solution of the test in 100 parts of water gradually affords, with a moderately-dilute solution of sal-ammoniac, a considerable flocculent precipitate which most probably consists of biantimoniate of ammonia.

Salts of Alumina.—Antimoniate of potash produces a voluminous flocculent precipitate in a solution of potash-alum, which re-dissolves to a clear solution in excess of alum; no crystalline deposit is formed, and only after very long standing of the liquid are a few flakes apparent at the bottom of the test-tube. When a dilute solution of alum is mixed with a *little* antimoniate of potash, the liquid remains clear, and is not rendered opaque even after long standing.—*Chem. Gaz. from Archiv. der Pharm.*

ART. XIII.—ON THE FORMATION OF HYDROCYANIC ACID
IN THE PREPARATION OF SPIRITUS ÆTHERIS NITRICI.

By MR. WILLIAM BASTICK.

IN Germany, it is customary among Pharmaceutists to use sugar or starch in conjunction with nitric acid for the development of hyponitrous acid, in the preparation of spiritus ætheris nitrici—a practice recommended by Liebig, and described by Dr. Pereira in his excellent work on *Materia Medica*.

An Apothecary of Berlin was led to believe, that hydrocyanic acid was generated in the spiritus ætheris nitrici, from the peculiar odour which it possessed when prepared in this manner.

At the suggestion of Professor Liebig, I undertook to examine the fluid obtained by this process, to see if the above surmises were correct; and I succeeded, by the most unequivocal tests, in showing the presence of hydrocyanic acid in it, especially when the receiver was kept sufficiently cool to admit of its condensation. I then estimated it quantitatively by precipitation, with a salt of silver, which gave, as the mean of three experiments, a precipitate of cyanuret of silver, of about one grain, which is equal to nearly one-fifth of a grain of anhydrous hydrocyanic acid in one hundred grains of spiritus ætheris nitrici, that being the quantity operated upon.

I endeavored to produce hydrocyanic acid by the substitution of oil of turpentine, a substance highly rich in carbon, in the place of alcohol, by this process, but did not obtain a trace of the acid. I have since examined the spiritus ætheris nitrici, prepared according to the London Pharmacopœia, but did not succeed in obtaining the slightest indication of the presence of hydrocyanic acid. At present, I have not

pursued the investigation far enough to give any satisfactory theory to explain the metamorphosis, which takes place among the elements of the sugar, the alcohol, and the nitric acid, in this process, in the formation of hydrocyanic acid, and I am not aware of any analogous case in Chemistry, by which to account for its production.

Mr. Redwood said, he had never heard of hydrocyanic acid having been detected in the spiritus etheris nitrici in this country, but had been informed that some of the nitrous ether of commerce contained an appreciable quantity of it. The nitrous ether, which was thus contaminated, was prepared from the residual liquor, consisting principally of alcohol and nitric acid, obtained from the manufacturers of fulminating mercury. Some manufacturers of nitrous ether had been obliged to discontinue the use of this liquor, in consequence of the difficulty of entirely getting rid of the hydrocyanic acid which it contained.

Trans. London Pharm. Society.

ART. XIV.—ON MADDER. By M. GIRARDIN, Professor of Practical Chemistry at the Municipal School of Rouen.

In commerce the name of *Lizari* has for a long time been restricted to the entire roots of the madder, while that of *Madder* is applied to the pulverized roots.

The *Lizari* are very little employed for the purposes of dyeing, and there is hardly any but the *Lizari* of Avignon which is met with in the markets of France. The *Lizari* of Cyprus is actually of rare occurrence ; that of Alsatia is never met with.

The powders called *madders* are distinguished according to their origin into *Dutch Madder*, *Alsatian Madder*, and *Madder of Avignon* or of the *Comtat*.

Up to the present time no one of the numerous works which have been written upon this subject, no work of *Materia Medica* or of applied botany, has given the history of these powders, nor the peculiar characters of each variety; I shall endeavor to supply this want by giving a detailed description of the three kinds of madder met with in commerce. My situation has enabled me to make a particular study of this important tinctorial product; and the following remarks are the result of many and various observations.

1. *Dutch Madder.*

The Dutch madder, which was formerly extensively employed in France, has almost entirely disappeared from our markets, from the heavy duty which the government purposely put upon it, in order to maintain and encourage the cultivation of that of Alsatia and of the Comtat. This madder possessed a well-deserved reputation, and there is no doubt but that it would again be generally used, if the duty, which is equivalent to a prohibition, were to be reduced. The following are its distinctive characters:—Its odor is strong and nauseous; its flavor is sweet, with a mixture of bitterness; its color varies according to the marks, and passes from a brown-red to an orange-red.

In general its powder is stringy (*en paille*), that is to say, its state of division is sufficiently large to exhibit the structure of the root. It is coarser than the powder of the other kinds of madder, which might be attributed to negligence, since frequently portions of Lizari are met with which have not yielded to the grindstone. This coarse state of comminution however is no defect, since it prevents fraud. This powder appears greasy to the touch. Exposed to the action of the atmosphere, it readily absorbs moisture, and when,

for the sake of ascertaining its quality, it is exposed to a moist air, its orange-red changes to a bright red, of a rich depth of color. The Dutch madder *works* more than the others, according to the commercial term, *i. e.* it presents more decided modifications of color by exposure to moist air.

Dutch madder is *stripped* or *not stripped*. In the first case, the roots have been freed from their epidermis, which gives greater brightness to the powder; in the second, they have been triturated without undergoing this operation, when the powder is of a more sombre color. This madder cannot be used while fresh; it must be a year in the cask at least. After three years it is in full vigor.

The *pale* powder, or of a yellow aspect the first year, soon undergoes fermentation with age; the divided parts then unite with each other, agglomerate, and increase in volume to such a degree, that, after several years, the dilatation is so great that the bottoms of the casks present a very marked convex form. The madder is then so hard, that in order to take it out of the cask, a mallet or chisel must be used. This madder ferments more than the others.

It keeps several years after having attained its greatest tinctorial power (about three years,) after which the layers which line the sides of the casks begin to lose their brightness; the madder assumes a pale brown color, and it enters into decomposition. The progress of this is slow but certain; it subsequently becomes quite extinct, and the madder has a brown-red color.

In its decomposition it may still be used for brown grounds or colors; but when age has destroyed all the coloring principle, it can only serve as *mulle*.

The marks current in our markets are—

Mulle O	-	-	} or {	Mulle.
Superfine	-	-		Fine grappe.
Not stripped or stripped				Superfine grappe.

This word *grappe* (bunch) is employed when age has given consistence to the powder. The term *grappe* is used to designate its state of agglomeration.

This kind of madder formerly came from Holland in oaken casks of the weight of 600 kilogrammes.

2. *Alsatian Madder.*

This madder, which has replaced the Dutch in our manufactories, although it does not possess all its qualities, has the following characters:—

The smell is less decided, more penetrating than that of the preceding; taste less sweet, equally bitter; color brown to bright yellow, according to the mark; state of division coarse. It easily absorbs moisture from the atmosphere; by long exposure it changes from yellow to a dark red; in use, however, it inclines more to yellow.

As is the case with the Dutch madder, it is not employed while fresh; it is in full vigor when two years old. It deteriorates sooner than the former; its fermentation is less decided; it grows very hard however in the casks, coheres to the very centre, and there is the same difficulty to extract it. The progress of decomposition is the same; the madder which has undergone this process can only be used for dark tints.

The Alsatian madder is never known by the denominations of *stripped* or *not stripped*, although the operation of *stripping* takes place. The marks alone distinguish the varieties. The marks known in our markets are—

O, Mulle.	—	SF, Superfine.
MF, Mi fine.	|	SFF, Superfine fine.
FF, Fine fine.	|	

The most generally used is FF.

SFF is nearly an exception to the method employed by the Alsations in grinding, who are strict enough in their marks to be unwilling to prepare a very fine quality, which would be to the injury of the preceding.

The madder of Alsatia is packed in oaken casks or hogsheads of 600 kilogrammes, in half hogsheads of 300 kilogrammes, in quarters of 150 kilogrammes, and in barrels of 100 kilogrammes. All these hogsheads are similar in form, and only differ in size.

It is at Strasburgh, Hagenau and Geisselbrunn that the so-called Alsatian madder is manufactured.

3. *Madder of Avignon.*

The madder of Avignon is most generally used at the present time, and even preferred to the other kinds, because the dyer and cotton-printer find it easier, by using it, to vary the reds according to wish. It is especially since the peace of 1815 that the use of this madder has greatly increased.

Of all the kinds of madder this is the sort which has undergone the most modifications; I may say, almost the only kind in which variations have been made in the marks and in the quality. In Holland and in Alsatia the quality specified is generally conformable to the mark. In Avignon, on the contrary, each manufacturer has a mark to designate its quality; and the mark SFF, which with one is beautiful, is but middling with another. The result is, that the trader cannot trust to the mark alone, which presents a different tint in each manufactory. The madder of Avignon therefore can only be bought after having been spread out to view upon linen.

The characters of this powder are,—odor agreeable, slightly penetrating; taste sweetish bitter; color either rose, bright-red or brown-red, according to the roots employed in the preparation and to the degree of mixture; state of division very fine; powder dry to the touch.

When submitted to the action of the atmosphere, it absorbs moisture less readily than the other species; however, it does not work less, and subsequently affords a pale or very dark red, according to whether the powder operated on was *rosy* or *palus*.

In Avignon they are not acquainted with the terms *stripped* or *not stripped* (*robée ou non robée.*) There the word *épuration* is used. A madder is purified from 3, 5, 7 or 10 per cent., and even as high as 15 per cent. This mode of expression is pure quackery, for how is a root to be purified except by depriving it of its epidermis, and how can we suppose that the root may contain at will so much more or less of it as to require that the purification should some times be carried to 15 per cent.? We should have to suppose that the weight of the epidermis was to that of the root as 1 : 7, 10 or 15, which is not the case.

The best madder is made with the roots of the *Palus*. In Avignon the name of *Palus* is given to some tracts of land anciently covered with marshes; these lands, enriched by animal and vegetable remains, are eminently suited for the cultivation of the madder, and the roots they produce are almost all *red*, whilst other kinds of soils produce rose-colored roots.

The powder from the *Palus* madder is of a dull and rather unsightly red, but on drying it becomes blood-red, which may be varied at pleasure. A small quantity goes much further than a larger quantity of the *rose-colored* root.

The *rose-colored* madder is made with the so-called *rosy* *Lizaris*. The powder is of a bright red, bordering a little upon yellow.

The madder, which is half *palus*, half *rosy*, forms a brilliant powder, which is well received in the market, and which affords very satisfactory results in dyeing. The brilliancy of the *rosy* madder mingling with the rich depth of the *palus*, produces a most beautiful red.

The madder of Avignon may be used immediately on leaving the mills; but the powder which has been preserved in casks for a year is decidedly preferable. It keeps well, and undergoes little or no fermentation in the casks; it

does not cohere in a mass; after several years, however, it is decomposed with nearly the same symptoms as the other kinds; it is still used in this state. The small degree of fermentation evinced by this madder arises from its containing much less mucilaginous, saccharine, and bitter substances than the Dutch and Alsatian madder; for it is certain that the acid fermentation which is so energetically developed in the latter must be attributable to these substances.

Although pressed with great force into the casks, the madder retains a certain quantity of air between its particles, which in time acts upon the whole mass and gives it a uniform color, by oxidizing the primitive yellow coloring principle and changing it into a red principle. This theory, advanced by M. Decaisne, very well explains why the madder powders are improved in quality by being preserved for a certain time in the casks.

The drying of the roots in the stove has great influence on the tint of the madder of Avignon. If dried at too high a temperature, the powder is dull, without, however, losing in quality.

At first only two kinds of Avignon madder were known, the *the yellow madder* and the *red madder*. The first has since disappeared, and the *rosy madder* is now substituted for it.

As to the marks, it is difficult to give positive information on the subject, especially since quackery has endeavored to deceive by extraordinary names. Originally only the following marks were known:—

Mulle.

FF, Fine fine.

SF, Superfine.

SFF, Superfine fine.

These marks were put upon the casks without other designations.

The tint alone decided to what sort of root the powder, belonged.

At present the madders are either—

Palus, or

Rosy, or

Half Palus, half rosy.

When it is wished to denote that a madder is all *Palus* a P is added to the mark. The following are the actual marks :—

Mulle, without distinctive marks.

FF	} To each of these marks the letter	
SFF		P is added for Palus,
SFFF		R for Rosy,
EXTF		PP for Pure Palus,
EPTSF		RPP for Pure Red Palus.
EXTSFF	} Half Palus, half Rosy, without distinction.	

According to these designations, it is by no means rare to find the absurd marks of

EXTSFRPP,

which is to be understood thus :—

Extra superfine fine pure red Palus.

It must be confessed that such absurdities can only exist in a country where fraud has made revolting progress. It often happens that the mark EXTSE, now used, is not equal to the old one of SFF.

The *extra fine* is especially manufactured with the heart or the ligneous part of the root. This mark gives less depth, because the ligneous part is less rich in coloring principle than the fleshy part or the bark of the root, but it affords a much more lively color. The madders of Avignon are packed in deal casks of 900 kilogrammes in weight. The insides of these casks are generally lined with very thick pasteboard, in order to prevent contact with the air, which blackens the powders, causes them to appear less

beautiful, and after a certain time destroys much of their tinctorial properties. Light also very quickly changes the coloring principle of these powders.

It is rather difficult to ascertain exactly the quantity of madder gathered each year in France, as well in Alsatia as in the ancient county of Venaissin.

In 1837 the crop of the Lizaris amounted, in these districts, to 1,200,000 kilogrms., which is equivalent to from 48,000 to 50,000 barrels, of which part was sent to the different places where it is consumed, as well within as without the country, conformably to the following table:—

	Kilogrammes.
Rouen, Havre, and Dunkirk, - - -	3,800
Antwerp, - - - - -	500
Genoa and Leghorn, - - - - -	183
London, Liverpool, and Glasgow, - - -	3,760
London, Liverpool, and Glasgow, 800 bales of lizaris, which represent - - - - -	3,500
Hamburg, - - - - -	530
St. Petersburg, - - - - -	1,608
Odessa, - - - - -	110
Rotterdam, - - - - -	423
Trieste, - - - - -	205
New York and Boston, - - - - -	812
Mulhausen, Strasburg, Metz and Basle, for the consumption of Alsatia, Prussia, Swit- zerland, Bavaria, Austria, &c. - - -	15,000
Total, - - - - -	30,481

There remained, therefore, of the harvest of 1837 at Avignon and in the department, from 18,000 to 20,000 barrels when the harvest of 1838 was about to be got in. This, although less than the former, amounted to between 36,000 and 40,000 barrels.

The manufacture at Avignon is always in a prosperous condition.

The state of the customs shows, that in 1840 there was exported from France 2,161,158 kilogrammes lizaris, which represent in value 1,620,869 francs, and 12,114,054 kilogrammes of madder (equal to 12,114,054 francs;) that in 1841 there were exported 1,896,416 kilogrammes of lizaris (equal to 1,422,312 francs,) and 11,840,886 kilogrammes madder (equal to 11,840,886 francs.)

The importation of foreign lizaris and madders is very small, on account of the heavy duties. The lizaris chiefly come from the Levant by way of Turkey, the Barbary States, from Tuscany, the two Sicilies, and from Germany. The madders come especially from Holland and Belgium.

Lon. Chem. Gaz.

(To be Continued.)

ART. XV.—ON SOME NEW LACTATES.

By PROFESSOR LEPAGE.

SINCE the year 1841, I have devoted myself to the preparation of lactic acid on the large scale, and consequently of lactate of iron, a salt introduced into therapeutics a few years ago, by Profestor Bouillaud.

I will not here recapitulate the process of extracting lactic acid, but will only observe, that for its preparation I employ whey, which is found in abundance, and free from water, in our neighborhood (Gisors) throughout the summer, at a very low price, and that, on the average, I obtain from 30 litres of this product (without addition of lactine)—following, for its saturation, the directions given by MM. Boutron-Charlard and Frémy—400 grammes of pure lactate of lime.

Lactic acid is now so well characterised that it can no longer be confounded with any other; nevertheless, its history cannot be regarded as complete. Feeling persuaded, therefore, that everything relating to the history of this acid, or to that of its combinations, must be interesting to chemists, I now publish the results of some experiments which I have tried with the view of obtaining various lactates not yet known.

I. LACTATE OF OXIDE OF ETHYLE (LACTIC ETHER.)

By distilling in a retort, furnished with an adapter and a receiver, a mixture of two parts of powdered and dried lactate of lime, two parts and a half of rectified alcohol, and one part and a half of sulphuric acid at 66° , taking care to stop the operation when the matter in the retort begins to turn brown, a liquid is obtained in the receiver, which, put in contact with fused and pulverised chloride of calcium, decanted after 24 hours' contact, and submitted to a second distillation, possesses the following properties:—

It is transparent, colorless, possessed of an odor somewhat resembling rum; its density is about 0.866 at 48° F., it boils at 170° F., under the pressure of $28\frac{1}{2}$ inches; it is neutral to test papers, miscible with water, alcohol and ether, in all proportions. A small quantity of this same liquid, left for a month in a flask filled with air, remained neutral to test papers.

The caustic alkalies decompose it into alcohol and lactic acid, which unites with the alkali; this phenomenon is especially apparent with lime. It is sufficient, indeed to agitate this liquid with a little hydrate of lime in a sealed flask for all to assume the form, the same day or the day after, of a white mass having the appearance of gelatinous alumine or silica. This mass easily liquifies in the sand-bath, and the liquefied product, filtered and suitably evaporated, gives, on cooling, a crystallized salt, which possesses all the properties of lactate of lime.

From these facts I think I may conclude that I have obtained lactic ether.

In the preparation of this product, all the lactic acid of the lactate of lime, liberated by sulphuric acid, does not enter into combination with the oxide of ethule; for, by diluting the residue remaining in the retort, filtering, in order to separate the sulphate of lime, and saturating by chalk, sulphate of lime is obtained, and is precipitated; there is found in the liquor a small quantity of lactate of lime, which is easily removed from it by evaporation.

II. LACTATE OF OXIDE OF METHULE.

By substituting pyroxilic spirit for alcohol in the foregoing preparation, I hoped to obtain lactate of the oxide of methule, but my expectations were deceived, for I could not detect in the product which I obtained any other products than those which belong to pyroxilic spirit: thus, for example, the liquid put in contact with hydrated lime does not assume the form of a jelly, as in the foregoing case; nevertheless, if it be filtered, the presence of a small quantity of lime may be detected in it; but it is impossible to obtain the crystallised salt by the evaporation of the liquid. When the experiment was repeated with pure pyroxilic spirit, absolutely the same results were obtained. Now, since pyroxilic spirit possesses the property of dissolving certain alkaline oxides, as was proved, a long time ago, by Dumas, and, among others, oxide of calcium, it must be admitted that the small quantity of this alkali found in the product which I examined, arose from the known property of lime dissolving in pyroxilic acid.

Another fact also tends to confirm my statement, that by saturating with chalk the residue removed from the retort and previously diffused in a sufficient quantity of water, I was able to extract from it a quantity of lactate of lime nearly equal to that which I employed.

Notwithstanding this negative result, it is probable that, in more favorable circumstances, lactate of oxide of methule might be obtained.

III. LACTATE OF CADMIUM.

To obtain this salt, two processes may be put in practice:—

FIRST PROCESS.—The lactic acid is saturated by hydrate or carbonate of cadmium, recently precipitated. The operation is accelerated by holding the phial in which the operation is conducted in water heated to from 158° to 176° F. When the liquid dissolves no more oxide, it is filtered, then evaporated at a very gentle heat until white pellicles are seen to float on the liquid. The capsule is then removed from the fire, and, on cooling, the salt is deposited in a spongy mass formed by the re-union of all the small needles. The small quantity of supernatant liquor is decanted; this liquor may give more salt by concentration; the product obtained is afterwards dried by heat, or in folds of blotting-paper.

SECOND PROCESS.—A concentrated solution of sulphate of cadmium is afterwards decomposed by a concentrated solution of lactate of lime. The proportions to be employed are about 20 parts of lactate of lime to 15 parts of crystallised sulphate of cadmium. It must be operated with ebullition, for without the heat the precipitation of the lactate of lime would take place very imperfectly, and would often require a long space of time. When it is ascertained that the liquor no longer contains either sulphate of cadmium or lactate of lime, it is filtered, and then evaporated, as in the foregoing case.

The lactate of cadmium obtained by each of these processes is a white salt, crystallised in very small needles. It is soluble in from 8 to 9 parts of cold water, and in four parts of boiling water; it is insoluble in alcohol; its aqueous solution acts with reagents like that of all the soluble salts of cadmium.

This salt presents, in its crystallization, a peculiarity, which is not, however, an isolated fact in chemistry—namely, that its solution saturated by ebullition does not crystallize by the cooling of the liquor, even after eight days (this, at least, is the phenomenon which two saturated solutions of this salt have presented to me.) To crystallize it, it must be again submitted to the action of heat; and if, as soon as some pellicles appear on the surface of the liquid, even before it enters into ebullition, the capsule be removed from the fire, the whole takes the form of a mass on cooling.

It is ascertained that lactate of cadmium prepared by the second process does not contain sulphate of cadmium in the mixture, by its very dilute aqueous solution not being rendered turbid by chloride of barium. But, in order to ascertain that it contains no lactate of lime, oxalic acid must not be added to its solution, as this acid causes in the soluble salts of cadmium an insoluble white precipitate of the same base. It should be operated in the following manner:—All the cadmium should be precipitated from the solution to be tested in the state of yellow sulphuret, by means of sulphuretted hydrogen; oxalic acid is thus added after the liquor has been filtered, and previously heated, in order to drive off the excess of sulphuretted hydrogen.

IV. LACTATE OF PROTOXIDE OF ANTIMONY.

I endeavored to dissolve in lactic acid oxide of antimony precipitated from emetic by the process of M. Durand, of Caen, or oxide precipitated from the same salt by ammonia, but without heat, and in both cases the acid dissolved only very minute quantities of oxide, incapable of saturating it. I think that protoxide of antimony, which, as is known, is endowed with almost as eminently electro-negative as basic properties, is, in general, little susceptible of combining alone with the vegetable acids; however, Berzelius describes several antimonial salts of organic acids. Having wished to prepare acetate of antimony with the same oxide as that

which I used for the lactate, this oxide refused to dissolve with or without heat in acetic acid, even when very concentrated.—*Chemist, from Journ. de Chim. Med.*

ART. XVI.—ON CAMPHOR.

Extract of a Letter, from E. O'REILEY, Esq., dated Amherst, 6th March, 1842, to J. M'CLELLAND, Assistant Surgeon, Calcutta.

“THE bottle herewith sent is part of a quantity of about 120 lbs., procured by evaporation from the tops of a plant growing profusely throughout the jungles on this coast, (specimen in flower enclosed in the box.) The attention of a few Chinese was attracted to it some months ago, by my enquiry whether the same plant was common in China, and to what purpose it was applied. I was informed that the plant, which is an annual, was cultivated in some of the seaward provinces of China, and that the salt procured from it formed a part of their Materia Medica, being considered efficacious in cases of rheumatic pains, and other diseases requiring emollients.

“The whole of the apparatus employed in procuring the salt is simple in the extreme, consisting merely of a large pan into which the tops are put, with a sufficient quantity of water to cover them over, in which is placed a cylindrical casing of wood, being smallest at the top, on which is fitted a large, shallow brass basin. A gradual heat is then applied, and the steam rising through the casing is condensed on the surface of the basin, which, being constantly supplied with cold water, causes a crystallization of the salt; this method is so rude, that it is impossible to form any correct idea as to the proportional parts of salt in a quantity of the plants: but, judging from its very strong odor when rubbed between the fingers, it may be supposed

to contain a very much larger proportion than is procured by the method just stated. Should it prove to be of any considerable value, or at all approaching to that placed on it by the Chinese who made it, the yearly produce of these jungles would amount to a very considerable item. On this head I shall be most happy to hear from you."

With regard to the letter of Mr. O'Reiley, we referred to Dr. Voigt, of Serampore, for information relative to the plant affording the Camphor, of which specimens both of the plant itself, and of the crude camphor afforded by it, had been forwarded by Mr. O'Reiley. Regarding the plant, Dr. Voigt states, that it belongs to De Candolle's genus *Blumia*, and is, as far as he can see, a new species; the genus however affords, Dr. Voigt remarks, several species presenting camphoraceous properties. The sample of camphor forwarded by Mr. O'Reiley, as obtained from the plant in question, which appears to be very common on the Tenasserim Coast, we placed in the hands of the Laboratory Assistant in the Honorable Company's Dispensary, in order to have a portion of it refined, and also that the various preparations of camphor in medical use might be prepared from it, which has been done accordingly, and the samples of the different articles obtained have been submitted, through the proper channel, to the Medical Board.

In refining this camphor, there is a loss of about 25 per cent. of its weight. The ordinary loss in refining China camphor is about 19 per cent. Taking the value of the latter at 4s. 8d. per lb. in its crude state, the usual rate being, for the present year, 2 rupees 8 annas per lb., that of the former would be 3s. 9d.; but last year the article was obtained for 2 rupees per lb., or 11d. per lb. less than its cost this year, so that the Tenasserim camphor would require to be delivered at 2s. 10d., or 1 rupee 5 annas per lb., in order to compete with the Chinese article. From the observations of Mr. O'Reiley, the plant seems to be very abundant, and the method of manufacture both simple and

efficient; so that there would not appear to be any obstacle to the article becoming an important production. In its refined form it is identical, in all its properties, with Chinese camphor.

Calcutta Journal of Natural History.

ART. XVII.—ON ISINGLASS.

A VERY important observation has been made relative to the structure of the air vessel of *Polynemus Sélé*, which will lead to the perfect purity of the isinglass, and place it on a footing with the best Russian description of the article; while the abundance in which it is afforded by this fish cannot fail to render it an object of great importance. When examining a sample of the article received from Mr. O'Reiley, of Amherst, weighing 12 lbs., and which cost on the Tenasserim Coast 4 rupees, it was found that each piece, from which the outer and inner membranes are removed, consists of an outer and an inner structure. The outer structure consists of a thin lamina, composed of *oblique* fibres, which are easily seen passing diagonally over the surface, and composing about ten per cent. of the whole. If the mass be divided crosswise into narrow sections, the transverse fibres may be perfectly separated into fine silky fibres, which consist entirely of pure isinglass. Mr. Scott, the Assistant, who was employed in the examination, suggested the separate analysis of the outer oblique fibres, when it was found that they consisted entirely of *fibrin*, and contained all the impurities for which the Bengal isinglass had hitherto been considered inferior.

Comparing one of the sections from which the oblique fibres had been removed, (No. 5 in the annexed table,) with a specimen of isinglass received from Dr. Royle, (No. 1 in the annexed table,) and said to be very pure, the resemblance was quite perfect, and it will be seen from the annexed table of analysis that, of the two, our own specimen is the

purest, the "loss" being chiefly gelatine. The analysis has since been frequently repeated with invariably the same result.

Isinglass examined in the Laboratory of the H. C. Dispensary, April and May, 1842.*

DESCRIPTION.	FIBRIN.	ALBUMEN.	GELATINE.	LOSS.	TOTAL.
1. Good Isinglass, received as a sample from Dr. Royle, in a letter under date 29th Nov. 1841, }	2.5	a trace.	97.5	none.	100 parts.
2. Imported with medical stores for public use from Europe, 1840-41. Invoice price 18s. per lb. }	2.5	a trace.	95.	2.5	100 parts.
3. Bengal Isinglass in the rough, as exported in 1839-40, and sold for 1s. 7d. per lb., inferior sample, }	10.	a trace.	87.5	2.5	100 parts.
4. Bengal Isinglass in the rough, as exported 1839-40, and sold for 1s. 7d. per lb., favorable sample, }	7.5	a trace.	90.	2.5	100 parts.
5. Ditto, with the outer oblique fibres peeled off,	1.25	a trace.	95.	3.75	100 parts.

* The following is a note by Mr. Scott, the Laboratory Assistant, detailing the manner in which the examination was conducted :—

"Twenty grains of Isinglass were introduced into a matrass with two ounces of distilled water, and dissolved over a water bath. The gelatinous solution, being carefully decanted, was then evaporated to its proper consistence, and the weight ascertained. The insoluble portion was well washed, dried, and its weight noted. The presence of Albumen was detected by the solution being rendered perceptibly opaque at a boiling temperature."

Ibid.

ART. XVIII. ON INDIGENOUS OPIUM.

Extract from a report of MM. DE MIRBEL, BOUISSINGALT, AND PAYEN, and process of testing founded on the comparative determination of the proportions of Morphia.

I WILL here sum up in a few words the history of the culture of indigenous opium, which I think, will be interesting to the reader.

Dubuc, of Rouen, was occupied in the year IX. with the culture of the *Papaver somniferum*, and with the preparation of opium in *extract* and in *tears* (*Ann. de Chimie*, t. 38, p. 181.)

M. Lorseleur Deslonchamps made numerous experiments with the view of substituting indigenous opium, under these two forms for the exotic products. On this occasion he received a testimonial of satisfaction from the class of the Institute.—(*Moniteur* of 1811, p. 775.)

The late Mr. Hennell obtained from 700 grammes of opium, cultivated in England, by Messrs. Cowloy and Stairs, 48 grammes of morphia. (*Botany of Drugs*: Thompson, p. 202.)

In 1817, The Society of Encouragement of London, awarded a gold medal to Mr. John Young for his method of cultivating the *Papaver somniferum*, and of collecting the opium from the capsule without diminishing the crop of seeds; but in recommending the combined culture of poppies and potatoes, the author announced exaggerated profits of 2,400 *francs per hectare*, which neither he nor others realised.

In the following year, Vanguelier demonstrated the presence of morphia in indigenous poppies; afterwards MM. Peschier, of Geneva, and Duprat, of Toulouse, also obtained

this proximate principle from the capsules of the *Papaver somniferum*; and M. Tilloy, of Dijon, extracted it in the large way, from the dried capsules deprived of their seeds.

In 1826, M. Petit, of Corbeil, employed the stems, leaves and capsules of the plant for preparing aqueous and alcoholic extracts which appeared to him to contain the same principles as exotic opium, the proportions being excepted; he announced that the opium obtained by incision of the capsules of poppies cultivated near Dijon had furnished from 16 to 18 per cent. of morphia,* a result which will appear incorrect when compared with the proportions obtained by the most skilful chemists.

Such were the conclusions of investigations made with great care by M. Dublanc, and communicated to the Academy of Medicine on the 15th of July, 1826, and 27th of March, 1827, at first on opium obtained by incision of the capsules, by M. Caffin, of Orsigney, agriculturist of Leinvet-Oise: this sample gave 2 per cent of morphia, whilst the mean of his analysis of opium from the East furnished 8 per cent.; another sample of opium obtained by incision of the capsules of the poppies cultivated in the environs of Toulouse, gave 4 per cent of morphia. M. Dublanc, was, moreover, occupied in this series of investigations, with the comparative determination of the various proximate principles contained in opium prepared by aqueous or alcoholic infusion and by decoction of the capsules of the artric plants; he quoted in support of his results, the investigations relative to the extraction of morphia from indigenous poppies undertaken by Vogel, Blondeau, Chevallier, Delafolie, and Geiger.

The conclusions of the work of Pelletier were much more encouraging, especially if we compare the analytical re-

* M. Caventou announced, in 1827, that 36 parts of indigenous opium contained 8 parts of morphia, or 22 per cent. (*Journal General de Médecine*, 2e, Serie t. VI., p. 72.)

sults with the idea expressed by the author, that the *Papaver somniferum* grows with facility in France, even on bad soils; but he should have informed us whether in this case the opium collected was as abundant and of as good quality, which is not very probable.

These experiments were undertaken with the view of determining the quality of the opium which General Lamarque had obtained by incision of poppies cultivated on his lands: in Pelletier's Memoir (*Journal de Pharmacie*, Vol. XXI. p. 572,) we read:—

“500 grammes of French opium will give 51 grammes of morphia,” corresponding to 10.2 per cent.

Further on, Pelletier adds:—“500 grammes of opium from the East will give only 45 grammes of morphia,” or 9 per cent.

It is evident that the comparative analysis of the opium of Smyrna and that of the environs of Bordeaux showed a difference in favor of the latter, analogous to that which we now find between the product collected in Algiers and the opium of the East.

With regard to the enormous proportions of 14 and 22 per cent. of morphia obtained by M. Caventou from samples of indigenous opium, they can be explained only by the impurity of the product.

The proportion of morphia indicated by Pelletier, more considerable than that obtained by the other experimenters, does not, however, amount to more than 10.2 per cent. of morphia for indigenous opium; we are not warranted in repressing a doubt relative to the proportion of 12 per cent. announced in a sample brought from Algiers.

Be it as it may, we do not think it right to raise, beyond the terms of our report, the hopes which we have expressed concerning our future collection of opium in Algiers.

The enlightened solicitude of the Duke of Dalmatia for the interests of our colony of Algiers, will doubtless induce him to continue his experiments on the culture of the *Pa-*

paver somniferum, and on the extraction of opium. We will examine the samples which may hereafter be sent to us; but in order that their quality may be ascertained on the spot, we think it right here to indicate one of the processes most easily followed, for determining, comparatively at least, the proportions of pure morphia in various indigenous and exotic samples.

Comparative analysis of samples of crude opium.

25 grammes of opium cut in very thin slices, and left to macerate in 150 grammes of pure water. After 24 hours' contact, it is triturated in a mortar until the hydrated matter is clear; then the most finely divided parts which the liquid holds in suspension are decanted on a filter; water is added to the residue, which is triturated *de novo* and decanted on the same filter which is again washed with distilled water until the liquor passes through colorless; an excess of well-slaked lime is added to the filtered solution;* the mixture is boiled for about five minutes, filtered, and the filtered solution is acidulated with hydrochloric acid, which saturates the lime and combines with the morphia. The morphia is precipitated by ammonia, the excess of which is driven off by boiling. The morphia is collected on a filter, and washed with alcoholised water, then dissolved in alcohol of 33 degrees; it crystallises by cooling; it is then sufficient to wash it with ether, to eliminate the narcotine; it is afterwards dried and weighed.

There certainly remains a small quantity of morphia in the liquid from which it has been precipitated; it might be obtained by a second treatment after evaporation, but the operation would then become long and rather more difficult; besides, this is not necessary for determining which

* One of the best means of completely slaking and thoroughly dividing lime consists in pouring on 1 part of quick lime two parts of boiling distilled water; in a few minutes the extinction will be complete, even when a small quantity is acted on.

of several samples contains most pure morphia; the most simple assay gives even more sensible differences, because the least rich opium is that which leaves in the solution a larger proportion of morphia relative to the quantity which it contains.

It would be desirable for all pharmaciens to take the trouble of testing the medicinal opium which they buy; they could then present to practitioners medicines less variable in their effects, and they would assist in the destruction of frauds, which would cease to be profitable to their authors, and which are sometimes so prejudicial to the interests of medicine.—*Chemist, from Journ de Chem Med.*

ART. XIX. PREPARATION OF MERCURIAL OINTMENT.

By M. FOSSEMBAS.

FEW Pharmaceutical preparations have given rise to so many investigations and theories as mercurial ointment; so much has been said on this subject, that the following may at first sight appear fastidious and useless.

I admit that it is not without a certain feeling of diffidence that I publish these observations, which have led me to the employment of a process by which I am able to prepare, in less than an hour, eight pounds of mercurial ointment.

The process which I have followed has nothing new in it, since it consists merely in the use of *rancid grease*; but it is of such easy and rapid execution, that I have considered it my duty to rescue it from the oblivion into which it has fallen.

Only twenty-five grammes, of this substance are required to the livre of ointment, and so small a quantity of product is not capable of giving injurious properties to a medicament, which *cannot long be preserved from rancidity*, and which is *seldom or never employed except in this state*.

The conditions of a prompt division of the metals are reduced to two :—1st. *To dividing by trituration*. 2d. *To preventing the re-union of the separated parts*.

The first condition is always fulfilled ; but the second seldom, if ever. Indeed, recent lard being deficient in agglutinative properties, cannot, therefore, retain the mercurial powder, and prevent the reunion of its particles.

Fresh lard is therefore incapable of completely “killing” mercury.

Will it be objected to me, that vigorously continued labor is always, in a little time, followed with success? To this I reply, that I have never seen the labor terminated before the grease had determined an evident odor of rancidity.

But why is this state of alteration favorable to the extinction of the metal? The examination of this very matter will serve for a reply.

That which at once attracts our notice in rancid grease, is its consistence. If it be left only until that degree of alteration at which it still possesses a certain softness, it is immediately perceived that it has acquired very evident agglutinative properties. If it be agitated in the mortar, it adheres very firmly to the pestle, and makes a noise similar to that made by beating turpentine.

If, into the midst of this matter thus triturated, a certain quantity of mercury be poured, the agitation being continued the metal will be immediately divided, and the *adhesion* of the grease, which will *envelope* each of its *particles*, will necessarily *prevent* their reunion. When we reflect on the profound and extensive division which each stroke of the pestle operates on a body so fluid as mercury, we shall not

be surprised at the possibility of causing, in a few minutes, large quantities of metal to disappear in a small proportion of rancid grease.

This being enunciated, I arrive at the facts, which prove it; and I will content myself with purely and simply relating them.

I for some months exposed to the contact of humid air about a pound of that fat, of little consistence, sold by the pork butchers. When I employed it, it was not hard, but it adhered tenaciously to the fingers. I took 200 grammes of it, and I trituated it for a few minutes in a marble mortar; it became as soft and as thick as honey. I poured into it four pounds of mercury, by portions of 300 grammes at a time, and five minutes sufficed for the complete extinction of the metal; only after having introduced the fourth portion, the ointment had acquired hardness; but the operation could easily be continued by the addition of a little oil of sweet almonds.

By operating as I have just said, I was able to incorporate four pounds of mercury in the 200 grammes of fatty substance employed. The microscope detected not the smallest metallic particle in the whole mass. Arrived at this point, I added the 1,800 grammes of fresh lard, half melted, and, after a quarter of an hour's agitation I had a perfectly homogeneous ointment, in which the mercury was irreproachably extinguished.

[The process described by M. Fossembas is not very new, as he himself acknowledges; but it succeeds very well. It is analogous to the method of MM. Coldefy and Simonin, which consists, as is known, in extinguishing mercury by means of a small quantity of lard, which has been prepared by melting it, pouring it into water, and exposing it to the action of the air.]—*Ibid. from Journ. de Pharm.*

ART. XX.—ON SOME PRINCIPLES OF WHITE CINNAMON.

By WÖHLER.

MEYER and Reiche undertook, at the invitation of Wöhler investigations concerning the principles of white cinnamon (*Costus dulcis*.) The following are the results:—

I. MANNITE.

Petros and Robinet first demonstrated the existence of this principle in the bark; but they left undecided the question as to whether it is really mannite. The present investigations have proved that this principle does not differ from ordinary mannite. The bark contains a very large quantity of it—about eight per cent. If it be boiled with water, and if the liquor be evaporated, a great quantity of an extract of a slightly bitter and acid taste is obtained: boiling alcohol removes mannite from the latter, and this mannite may be easily obtained colorless by several crystallizations. The portion insoluble in alcohol contains, besides other principles, starch and many salts, particularly a calcareous salt.

II. ESSENTIAL OIL.

Ten pounds of bark gave, by distillation with water, 12 drachms of volatile oil. It was lighter than water and had a strong aromatic odor. In another preparation, in which much less bark was employed, and in which the distilled water had been cohabated several times, an oil finally passed over which sunk in water.

The whole quantity of crude oil obtained was left for several days, frequently stirred, in contact with a concentrated solution of potassa; the mass was then diluted with water, and the oil was extracted by distillation. The greater

part of the oil distilled floated on the water, but there finally passed over an oil which sunk to the bottom of the vessel.

So small a quantity of this heavy oil was obtained, that only one analysis of it could be made, which was defective. This oil had a peculiar odor, not comparable with another oil. It was not possible to combine it with potassa.

The solution of potassa, from which the oil had been extracted by distillation, was separated by filtration from a small quantity of a deep brown semi-resinified oil, which also floated on the surface; it was then saturated with sulphuric acid, it became milky and was afterwards distilled. There was obtained, but in small quantity, an oil heavier than water, sufficiently characterised by its odor resembling oil of cloves (caryophillic acid.) It easily and completely dissolved in potassa, and was again separated from it by the acids.

The light oil, which formed the greater part of the whole oil, greatly resembled in odor, oil of cajeput; it was submitted with water to a fractioned distillation.

The portion which first passed over boiled at 356° F. It contains in 100 parts:—

Carbon,	-	-	-	-	75.25
Hydrogen,	-	-	-	-	11.28
Oxygen,	-	-	-	-	13.46

Another portion of this oil was distilled alone and very slowly in an oil bath of the temperature of 330° F. until about half was distilled over. It presented the following composition:—

	I.	II.
Carbon, - - -	79.12	79.09
Hydrogen, - -	11.58	11.71
Oxygen, - - -	9.30	9.20

The portion of oil which came over last was by fractioned distillation with water, and whose odor likewise greatly re-

sembled that of oil of cajeput, had a specific gravity = 0.941 and its boiling point amounted to 473° F. It was formed of

	I.	II.
Carbon, - - -	80.56	80.52
Hydrogen, - - -	10.66	10.88
Oxygen, - - -	8.78	8.60

It is to be regretted that the total quantity of crude oil at the disposal of the operators was too small to allow of new investigations with the view of arriving at a more exact separation, and at a more accurate analysis of these different oils; but, at all events, this work shows that the oil extracted from white cinnamon is probably formed of four different oils; one of them is certainly identical with oil of cloves, and another is probably identical with the most important principle of oil of cajeput.

III. ASH OF THE BARK.

The bark dried in the air left, after combustion, nearly six per cent. of ash. The latter contained nearly 86 per cent. of its weight of carbonate of lime, and not quite two per cent. of silica. It contained only a small quantity of carbonate of potassa, but it contained altogether more than four per cent. of potassa, and 1.3 per cent. of soda; the other bases were magnesia, peroxide of iron, oxide of manganese, and alumina. The bases were partially combined with chlorine, and sulphuric and phosphoric acids. About 2.5 per cent. of phosphate of protoxide of manganese was found.

London Chemist, from Ann. der Chem.

MINUTES OF THE PHARMACEUTICAL MEETINGS.

February 5th, 1844.

Professor CARSON in the Chair.

The minutes of the preceding meeting were read and adopted.

The Journal de Pharmacie et de Chimie, and the Journal de Chimie Medicale for December, were presented to the meeting.

The Committee appointed at last meeting on the paper of Lawrence Turnbull, reported in favor of the publication of the formula for "Chemical Cold Cream," suggested by the author. The Committee were of opinion that the introduction of a small quantity of biborate of soda, whilst it whitened the preparation, did not interfere with its medical utility. From some experiments made by them, that salt appears to owe its effect on oleaginous substances to its alkaline nature, and resembles in this respect the carbonate of soda, though much less caustic than the latter. They further believe that the substitution of so large a portion of wax for the spermaceti is improper, inasmuch as the freezing point of the latter is much less than the former, it being understood that the ready melting on the skin of an ointment used like cold cream is a desideratum. They approved of the introduction of the oil of roses and of the reduction of the quantity of rose water to one half. In conclusion the Committee remarked, that, from its greater consistency, the ointment made by the formula under consideration would be appropriate for summer use.

A paper on the "Volatile Oil of Fire-weed," (*Erethites præalta*,) was read by Augustine Duhamel, and a specimen of the oil presented for examination. It was referred to the Publication Committee.

A communication was received from Edward Parrish, on "Syrup of Chamomile," which was read and referred for examination to A. Duhamel and Wm. Procter, Jr.

A communication from Peter Lehman, on Stewart's formula for Hydrarg. C. Cretâ, which was read and referred to the Publication Committee.

Augustine Duhamel presented a fine specimen of butter of Cacas, in the form in which it was received from South America.

William Procter, Jr., presented a specimen of *Senegin*, or polygalic acid, and stated that it had been separated from a tincture of Seneka made with diluted alcohol, and which had been exposed in a cold situation during several months. The powder thus deposited, after solution in boiling alcohol, from which it separated on cooling, was found to be nearly pure polygalic acid. Its taste is very pungent, and has the properties of that substance as described in the books.

Professor Bridges called the attention of the meeting to some experiments he had been making on the property which anthracite possesses of absorbing gaseous ammonia, like ordinary charcoal. The views of Liebig relative to the part which carbon performs in the soil of absorbing gaseous bodies, particularly ammonia, he thought might be applicable to anthracite; and that the large quantities of of pulverised coal which exists and is constantly formed at the mines and depots for this substance, might be applied to manure. Dr. Bridges found that a solid fragment would absorb five and a half times its bulk of ammonia; in small pieces, eleven times its bulk; in coarse powder, twenty-eight times its bulk; and in fine powder a greater quantity. Should experience prove the efficiency of this material as a fertilizing agent, it will add another to its already numerous features of usefulness.

William Procter, Jr., stated that having occasion recently to prepare some mercurial plaster, he varied the formula so far as to triturate the mercury with one-fourth of the pre-

scribed quantity of resin and oil, without previously melting together, and that the metal was rapidly extinguished. The remainder of the resin and oil was melted with the plaster, and the whole added to the mercury after it had been sufficiently triturated.

March 4th, 1844.

Professor BRIDGES in the Chair.

The last minutes were read and adopted.

The Report of the Committee having in charge the communication of Edward Parrish on Syrup of Chamomile, was read and adopted, the report being in favor of the publication of the formula.

A specimen of Syrup of Manna was presented by Augustine Duhamel. It was made by dissolving five ounces of manna and sixteen ounces of sugar in sufficient water, and by boiling to make a syrup of 32° Baumé when cold. It has been employed by several German practitioners as a mild laxative for children.

Dr. Carson made some remarks respecting a specimen of Catechu in his possession, which agreed with the description in the books, of the variety known as "*Catechu in quadrangular cakes.*" It is in irregular cubical masses, light brown color externally, and buff internally. It has a marked astringent taste, but is evidently an inferior variety. It was referred to Augustine Duhamel, J. H. Ecky, and William Procter, Jr., for examination.

April 1st, 1844.

Professor CARSON in the Chair.

The minutes of the last meeting were read and adopted.

A communication from John H. Ecky, on the Extract of Seneka and Squill, with instruction for preparing Compound Syrup of Squill, was read. It was accompanied by a specimen of the extract, and was referred for consideration to Charles Ellis and Thomas P. James.

An interesting discussion ensued as to the relative merits

of honey and sugar as vehicles in the preparation of Compound Syrup of Squill.

Dr. Carson made some observations on the plant called "matico," from Upper Peru, and contributed a specimen. The plant has the characteristics of a Piper. It is used in dressing wounds as a hemostatic application, and from the benefit in such cases has acquired the appellation of "soldiers' weed." Dr. Ruschenberger, who first brought it to the United States, has employed it in the Naval Hospital at Brooklyn, as a stimulating and styptic application locally, in several external subacute inflammatory affections, as well as internally, and, he states, with advantage.

At a meeting of the Philadelphia College of Pharmacy, held April 15th, 1844, the following Officers were elected for the ensuing year:—

President.

DANIEL B. SMITH.

1st Vice President.

CHARLES ELLIS.

2d Vice President.

ELIAS DURAND.

Treasurer.

JOSEPH C. TURNPENNY.

Secretary.

DILLWYN PARRISH.

Corresponding Secretary.

WILLIAM HODGSON, JR.

Trustees.

DR. JOSEPH CARSON,
W. W. MOORE,
JOHN H. ECKY,
WILLIAM PROCTER, JR.

WARDER MORRIS,
EDWARD PARRISH,
JAMES L. ELLIOTT,
RICHARD W. TEST,

Publishing Committee.

CHARLES ELLIS,
WM. PROCTER, JR.
A. DUHAMEL,
DR. ROBERT BRIDGES,

AMBROSE SMITH,
THOMAS P. JAMES,
DR. JOSEPH CARSON,

MISCELLANY.

On the constituents of Canella Alba. BY MEYERS AND REICHE.—This bark contains about eight per cent, of *mannite*, which may be readily separated from the aqueous bitter extract by means of alcohol. Starch and many salts remain undissolved. The ashes of the bark amount to 6 per cent., and contain 86 per cent. of carbonate of lime, 4 per cent. of potash, and 1.2 per cent. of soda, a small portion of magnesia, peroxide of iron, protoxide of manganese, alumina, chlorine, sulphuric and phosphoric acids, and silica. The most interesting constituent is the *volatile oil*, 12 drachms of which were obtained by the distillation of 10lbs of bark. This oil is specifically lighter than water, but a portion of it is observed to sink. If the crude oil be shaken together with a solution of potash, diluted with water and subjected to distillation, a light oil passes over first, and subsequently a heavier one. The *heavy oil* has a peculiar odour, does not enter into combination with potash, and contains 73.7 carbon, 10.7 hydrogen, and 15.6 oxygen. On filtering the solution of potash from which the oil was distilled, neutralizing it with dilute sulphuric acid, and again subjecting it to distillation, a small quantity of the heavy oil passed over, and was readily recognised by the peculiar odour, analogous to that of the oil of cloves. The *light oil*, which constitutes the chief bulk of the volatile oil, resembles the oil of cajeputi in odour. It was distilled in separate portions. The oil which passed over at 356° Fahr., contained 75.25 carbon, 11.23 hydrogen, and 13.46 oxygen. A portion distilled slowly at 326° Fahr., yielded 79.12—79.09 carbon, 12.58—11.71 hydrogen. Finally, the portion which passed over at last, bore the most striking resemblance to the oil of cajeputi, boiled at 473° Fahr. and had a specific weight=0.941, contained 80.56—80.52 carbon, and 10.66—10.88 hydrogen.—*Lond. Pharm. Journ. from Annalen der Chemie und Pharmacie.*

On the volatile oil of Pinus Abies. (Norway Spruce Fir.) By GOTTSCHALK.—It is a well-known fact that a forest of Norway spruce fir-trees by no means diffuses the odour of the oil of turpentine, nor has any one yet succeeded in obtaining resin artificially from that oil. The tree contains, perhaps, an oil differing from, but capable of being converted into, the oil of turpentine; it is also probable that the stem of the tree and its root contain different oils. Gottschalk, on Wöhler's suggestion, dis-

tilled the young twigs of the *Pinus Abies*, deprived of their leaflets, with water. He obtained a thin colorless oil, which boiled at 320° Fahr., and diffused the odour of the young leaves of the Norway spruce fir-tree; it became, on exposure to the air, soon resinous, and was not changed on distillation with a moderately strong solution of potash. Distilled with crystallized fused hydrate of potash, it assumed the odour of oil of turpentine, and the potash then contained resin. The rough anhydrous oil consists of 87.07 carbon, and 11.89 hydrogen; a portion distilled separately yielded 87.4 carbon, and 11.77 hydrogen. It therefore consists of a large proportion of oil free from oxygen, and of an oil containing but little oxygen. Potassium disengages but little oxygen from it, and then maintains its metallic lustre. A small quantity of a brownish substance is formed. The oil, after this treatment, has a more agreeable odour resembling the oil of lemons or oranges; it is fluid, burns with a bright flame, and has a specific weight 0.850 at 68° Fahr.; it boils at 332°, absorbs much muriatic acid, but does not enter into any solid combination at 32° Fahr., and consists then of 88.38 carbon, and 11.78 hydrogen, like the oil of turpentine.—*Ibid from Ibid.*

On the composition of the Oil of Horse-Radish. (Oleum armoraciæ.) By CARL HUBATKA.—The root of the horse-radish was cut into thin slices, and distilled several times with water; 100 pounds of the root yielded from five to seven drachms of volatile oil.

When pure, the oil has a specific weight=1.01; and is of pungent odour, resembling the oil of mustard. It acts powerfully as a local irritant, reddening the skin to which it is applied; it is soluble in spirit and ether, but slightly so in water. Chlorine changes the oil into a thick dark mass, with the development of muriatic acid, sulphur, and chlorine. Treated with alcohol, a viscid mass remains with the odour of melted sulphur. Concentrated nitric acid reacts very powerfully on the oil forming nitro-sinapylic resin. Liquid sulphuric acid has a powerful reaction with it, developing sulphurous acid. With ammonia, it forms a white crystalline combination, like the oil of mustard. Digested with fresh oxide of lead, and evaporated in a water-bath, sulphate of lead is obtained, and a substance resembling sinapoline. In odour, specific weight and reaction, the oil of horse-radish bears so strong a resemblance to the oil of mustard, that analysis could but corroborate their identity.

0.3328 grains of oil of horse-radish gave,

Carbon 0.5858, and water 0.1575.

This would correspond with the composition of the oil of mustard, which is,

Atoms.	In 100 parts.	
	Calculated.	Found.
8 Carbon	606.83 . .	48.60 . . 48.41
5 Hydrogen	62.40 . .	5.00 . . 5.26
1 Nitrogen	177.04 . .	14.18
2 Sulphur	402.33 . .	32.82

1 Atom of oil of mustard = 1248.60 . . 100.00

The combination with ammonia yielded on analysis the following results :

First: 0.5923 grains of oil of horse-radish, 0.883 grains carbon, and 0.377 grains water.

Secondly : 0.663 grains of oil of horse-radish, 0.989 grains carbon, and 0.413 grains water.

The combination with ammonia, therefore, corresponds in composition with that of the oil of mustard, and the two oils may be considered as identical. It is singular that man should have selected horse-radish and mustard as condiments, on account of their analogy in taste, as he also thus detected the analogy between tea and coffee.—*Ibid from Ibid.*

On the frequent occurrence of Lead in Cochineal.—M. Dietrich, in a letter to Prof. Wöhler, mentions his having received a parcel of cochineal, which in appearance left nothing to be desired as to quality, but which had nevertheless been subjected to a gross sophistication. The white coating, for instance, was artificial and contained so many granules of lead that they amounted to nearly 12 per cent in weight. When the mixture was reduced to a very fine powder, and then carefully suspended, a bright metal remained behind. Since cochineal is frequently employed by pastry-cooks the sophistication is highly dangerous: and this adulteration appears now to be very generally adopted, for all the samples of cochineal which the author examined proved to contain lead. *Chem. Gaz. from Archiv. der Pharm.*

Extemporaneous Vesicant. By DR. DARCY.—Into a flat watch glass, pour from 8 to 10 drops of very concentrated ammonia; cover the liquid with a large piece of linen on a rather less diameter than that of the glass, and slowly apply this little apparatus to the previously sheaved skin. Keep the whole in its place by means of moderate pressure with the fingers.

As soon as a red ring, about 2 centimetres in breadth, is observed round the glass, it is certain that vesication is effected. Sometimes scarcely

30 seconds are necessary for obtaining this result. It remains only to remove the apparatus, to wash the part, and to tear away with a pair of nippers the epidermis, which comes off easily and in one piece.

The dressing is according to the object in view,—to the indications of the endermic method for example.—*Chemist from Bull. de Therap.*

Preparation of Syrup of Gentian. By M. E. TAUVEL.—Syrup of Gentian prepared according to the Codex, loses its transparency a few days after its preparation, and becomes very turbid after some time. This syrup, already disagreeable to take on account of its great bitterness, is still more repugnant to the patient, because it has not that agreeable aspect to the eye which seems to contribute greatly to ameliorating its bad taste.

With the view of obtaining a syrup of gentian which retains its transparency without its medicinal properties being weakened, I have adopted the following process for above a year, and it always gives a good product: I have preserved the proportions of the Codex :—

Gentian-Root in coarse powder	48 grams.
Cold water	qs.
Simple Syrup	1,500 “

The gentian is lixiviated in the displacement apparatus with a sufficient quantity of cold water; the operation is stopped as soon as the liquid which flows out appears less *charged*. The liquor is filtered and briskly mixed with the boiling syrup brought to such a consistence that, the liquor being added to the syrup, the latter marks 30° of the areometer.

By this process, syrup of gentian retains its transparency for an indefinite period: it is quite as bitter, and more aromatic, and possesses more odour than that of the Codex. I have some which has been prepared more than six months, which is as limpid as on the first day.

I have made it comparatively—1st, according to the Codex; 2d, with extract; 3d, by the method which I point out. That of the Codex presents the objection already noticed, that of becoming turbid. That mode with extract preserves its liquidity, but it is less odorous than the two others. I need not repeat what I have said concerning the third.

It is known that gentian root is a substance which very difficultly yields to lixiviation, on account of its viscosity; but with a few precautions, by sifting the powder very finely, the difficulties are easily overcome.—*Chemist.*

Employment of Chloride of Zinc in Toothache. By DR. STANELLI.—According to Dr. Stanelli, the chloride of zinc, liquified by exposure to the air, possesses the property of calming dental pains.

His mode of application is most simple. By means of a small hair pencil, a small quantity of it is applied to the cavity of the painful tooth, and in the space of a few minutes it appeases the most acute sufferings, without causing any irritation.

Before proceeding to the application, it is indispensable carefully to surround with cotton wadding, and, when the chloride has been applied, to well fill the cavity with this same cotton. The mouth is finally washed with a little warm water.

The author affirms that he has obtained uniform success from this means in more than fifty cases, and that he has never observed the progress of the caries rendered more active by it.—*Chemist, from Annali Univ. de Med.*

Case of Ergotism. By JAMES B. THOMPSON, M.D.—This disease, if disease it may be called, is often met with amongst the natives of the western coast of Africa. It was remarkably well marked in the following case :—

The subject was a lad of about eighteen years of age, servant to the brother of Governor Rankin, then residing at the Gambia. It was observed, that whenever this boy was in the act of brushing the flies and mosquitos from his master while at dinner, he dropped off into an apparently sound sleep, and remained fixed in his then position. He was often noticed to do the same, when about to get anything from off the side-board, or in opening a closet in the dining-room. It was often amusing, indeed, most laughable, to behold him during this period of somnolency. He was not unlike a person going about the house in his sleep. Indeed, there seems to be some analogy between this affection and that of a confirmed somnambulist; but the former cases are more generally followed by serious, sometimes fatal consequences, after a period of years has elapsed. It would appear as if the circulation in the brain was much engaged; death, in such cases, mostly terminating in a form of asphyxia apoplexy. I am not aware that autopsies have thrown any light as yet on the subject; nor do I imagine we are as yet in possession of the most judicious treatment for such anomalous cases.—*Ibid, from Med. Gaz.*

Method of Removing Marking Ink from Linen. By DR. BOETTGER.—I recollect having read some time ago, in a chemical or polytechnical paper, an essay in reference to the foregoing question, in which the use

of aqua regia was recommended; but, besides that this powerful agent will hardly ever generally be employed by the female sex for the removal of names and figures from fine cambric, lawn, and linen handkerchiefs, a doubt as to its efficacy can hardly be suppressed; but not having had an opportunity of putting this method to the test, I abstain from giving any contrary decision, and at once proceed to communicate a means producing the effect with certainty, at the same time in no way injuring the materials, which will be interesting to many and principally to chemists.

The substance to be employed consists simply of a somewhat concentrated solution of the cyanide of potassium of Liebig.

Here I may be allowed to remark that the pure cyanide of potassium employed to form this salt must be free from sulphate of potassa, in order wholly to prevent the formation of a combination with sulphur during the calcination, which might interfere with the object in view. The said precaution in forming the cyanide of potassium should never be lost sight of by those who make gold or silver solutions.

Writings made with chemical marking-ink on white bodies, table linen, towels, &c., of some years' standing, were in a very short time removed by gently rubbing the materials with a somewhat concentrated solution of cyanide of potassium, no injury whatever being perceptible even in the finest fabric. If a little common writing-ink enter into the composition of marking-ink (which sometimes is done with the intention of improving the freshly made figures,) then, in addition to that, the spot or figure to be removed must afterwards be treated with a hot concentrated solution of oxalic acid.

The black and reddish spots produced on the skin by solutions of gold and silver, are also in the same manner easily removed by the before mentioned saline solution.—*Ibid.*, from *Ann. der Chem. und Pharm.*

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JULY, 1844.

ART. XXI.—ON CANTHARIS VESICATORIA.

By ROBERT COULTON DAVIS.

An Inaugural Essay.

CANTHARIS, U. S.

CANTHARIS vesicatoria.—*Class*, Insecta; *Order*, Coleoptera; *Family*, Trachelides; *Tribe*, Cantharidæ.

Physical Characters of the genus Cantharis.—Tarsi entire; nails bifid; head cordiform, not produced into a rostrum; thorax narrower than the upper part of the head, nearly square, but attenuated in the anterior part; elytra flexible, covering the whole abdomen, linear and cylindrical; wings perfect; maxillæ with two membranous lacinæ, the internal one acute within, subarcuate; maxillari palpi larger at tip; antennæ longer than the head and thorax, rectilinear, first joint longest, the second transverse, and very short.

This species has been often miscalled *Meloe*, but from which it is easily distinguished by the form of the head and antennæ, which in the *Cantharis* is cordiform, whilst that of the preceding is nearly square; and also by the absolute want of wings, and the linear and semi-cylindrical wing cases of the *Cantharis*.

The *Cantharis vesicatoria*, is about two-thirds of an inch in length, and one-fourth of an inch in breadth, of oblong shape, and of a brilliant green, golden red, or copper colour,

with very long and flexible wing sheaths, marked by three longitudinal stripes, covering very thin membraneous transparent wings. The head is surmounted by several jointed antennæ.

Natural History.

This class of insects is a native of the continent of Europe, and the West of Asia. They are much more abundant in those countries which lie nearer the equator, than those which are farther north, and are possessed of much greater vesicating properties.

We derive most of our supply from Spain, Italy, and the South of France. Considerable quantities are also exported to St. Petersburg, from the southern parts of Russia, but which rarely, if ever, reach this continent. They may be easily distinguished from the former by their larger size, and their color approaching to that of copper.

Cantharides are generally gathered during the months of May and June, on the privet, ash, elder, lilac, white poplar, and a species of honey-suckle, in Spain, Italy, and France. The retreat of this insect is easily discovered, by reason of the peculiarly strong and fetid odor which fills the atmosphere for a great distance around, which is exceedingly offensive, and can be only compared to that of mice. Such numbers are sometimes congregated together in the air, that they appear like swarms of bees. The time appointed for their collection is in the morning before sunrise, on account of their being readily shaken from the trees, owing to their torpid state, caused by the coldness of the preceding night; or they may be taken by smoking the trees with the fumes of burning sulphur, previously spreading a cloth beneath the trees to collect them in.

The persons who gather them have their faces masked, and their hands covered by thick gloves. They are then packed, (previously being exposed to the vapor of boiling vinegar to destroy vitality, and carefully and thoroughly

dried in the sun, or in rooms heated by stoves for that purpose) in nearly air-tight cases lined with paper, to exclude as much as possible the atmospheric moisture.

Properties.

When exposed to moisture, cantharides speedily undergo decomposition, and are thus nearly, if not wholly unfit for use. If cantharides have been properly dried and kept in well stoppered bottles, they remain unchanged both in appearance and in color, and retain their vesicating properties unimpaired for a great length of time. A case is upon record of their being kept in this manner for thirty years. Sometimes, in spite of every precaution to preserve them, they will be attacked by a very small worm which preys upon and destroys the inner and softer parts of the body, while the harder portions remain untouched. It was for a long time thought that the part destroyed was totally unproductive of vesication, and that the remainder alone contained the virtues, but which has been satisfactorily proved to be incorrect. Various methods have been devised to destroy this insect, viz. by camphor, acetic acid, and by placing the bottle containing the infected flies in water, (which must be raised to the boiling point,) which destroys both the worm and the egg without injuring in the least the virtues or the appearance of the flies; the access of water to them must be carefully avoided. The Spanish flies, when dried, retain the color and the disagreeable odor to a great degree as in the living state. These, when first taken into the mouth, have a bitter taste, but upon being chewed become exceedingly burning and acrid. The powder is of a dark brown, bordering on a grayish color, interspersed with numerous shining particles, consisting principally of the head, wing cases, and of the legs. The golden red or green color should never be considered as a test of its superiority, as it is very permanent, scarcely being acted upon by boiling water, ether, alcohol, the essential or

fixed oils. The active principle itself may indeed be entirely extracted, without even injuring the color.

Cantharides should not as a general rule be purchased in powder, except when entire confidence is placed in the vender; and then it is important to ascertain that they have been recently reduced to that state.

Analysis.

Various attempts to analyze cantharides were made by many chemists, but no very satisfactory results were obtained, until the subject was taken up by Robiquet in 1810. After an elaborate analysis, he found them to contain the following constituents, viz. 1. A green oil, insoluble in water, but soluble in alcohol and inert as a vesicatory. 2. A black matter soluble in water, insoluble in alcohol, and inert. 3. A yellow viscid matter soluble in alcohol and water, likewise inert. 4. Cantharidin. 5. A fatty matter insoluble in alcohol. 6. Phosphates of lime and magnesia, acetic acid, and, in the recent state, a small quantity of uric acid.

Orfila has since discovered a volatile principle, upon which the peculiar disagreeable odor of the fly depends. It is separable by distillation with water.

Cantharidin, the substance on which the blistering property depends, is prepared by boiling cantharides in water until every thing soluble in that liquid is taken up; then evaporate to the consistence of a thick syrup, and boil it continually in alcohol until that liquid ceases to act upon it; evaporate the solution thus obtained to dryness over a water bath, and put the residue in a well-stoppered bottle containing ether, and shake the mixture for a considerable time. The ether at first will seem not to be effected by it, but after a few hours it will assume a beautiful yellow color. Then separate the solution from the precipitate by decantation, and allow it to evaporate spontaneously in a dry atmosphere. After evaporation, the result will be found

to be cantharidin, in small crystalline scales, mixed with a yellow substance which is readily dissolved by alcohol, taking up this coloring principle, but which does not affect the cantharidin. These crystals are then to be dried between the folds of bibulous paper. Cantharidin, when pure, is insoluble in water or cold alcohol, but it is soluble in boiling alcohol, (which precipitates on cooling,) ether, and the oils. It is capable of being fused and volatilized by heat without decomposition, the condensed vapor being composed of acicular crystals.

A small quantity of cantharidin prepared by the writer, by the above process, and dissolved in olive oil, produced vesication in about two hours. An aqueous extract, made by boiling the flies in water for a few hours, filtering and evaporating over a water bath, caused the same effect in six hours.

A quantity of cantharides was digested in spirits turpentine for twenty-hours, and prepared in the same manner as above, to produce an extract. This extract was applied to the writer's arm, and in less than three hours the surface to which it was applied was in a complete state of vesication, attended with much pain, and which did not entirely heal for the space of ten days.

A tincture of cantharides made with ether, and also one with spirits of turpentine, when suffered to evaporate spontaneously, will leave a crystalline mass, which is no doubt cantharadin, as this will vesicate in about the same time as that of cantharidin with oil.

Passing from the general history of the *Cantharis vesicatoria*, its natural history, &c., I purpose making a few remarks principally on a few pharmaceutical preparations of it, with some observations upon the blistering cerate of the shops.

It is the generally received opinion, that cantharides are injured, as regards their vesicating properties, by a high or protracted heat in the preparation of the Cerat. Cantharidis.

This opinion has recently been the subject of doubt. Some of our most accurate and scientific pharmacutists have been led, as the result of careful experiments, to believe that far too much importance has been attached to the degree of heat that may be safely used in its preparation. Without intending to assert a contrary opinion, it is a subject of so much importance, that repeated experiments should be made, and repeated trials to test the certainty of those experiments, where a long established usage is about to be changed. The theory that a solution of cantharidin is effected by the higher degree of heat used, which, when combined with the wax and resin, will form a more active vesicating ointment, is plausible; but my own experiments have not been attended with that result. After a careful trial of this new method of making the cerate, in which its activity was decidedly injured, and a similar result having occurred in one other instance, I am induced to believe that the risk of lessening instead of increasing the vesicating quality of the ointment is greater than any advantage that will be likely to result in deviating from the formula of the U. S. Pharmacopœia. It is possible that by the use of a water bath, and very great care, this injury may not occur; but every apothecary knows that the health, if not the life, of a fellow-being may depend upon the efficacy of a blister; and that his own reputation, if not that of the physician who reposes confidence in his skill, may be injuriously affected by inertness in that among other remedies which he is called upon to prepare. He feels, therefore, the responsibility that rests upon him, as well in adopting any proposed change as in the necessity of insuring certainty and uniformity in the strength of this important therapeutic agent. As expense should not be regarded in attaining this object, I will offer the following formula to those who may feel inclined to vary from the excellent authority of our national Pharmacopœia. It will be perceived that it is a combination of the two methods. If any

advantage is likely to arise from the separation of the cantharidin, it will be attained by its incorporation in the form now proposed, at the same time that we shall incur no risk of diminution in strength by a deviation from long tried experience.

Take of Cantharides in fine powder,	℥xij.
Resin, Yellow Wax, Lard, of each	℥viiij.
Ft. Ung. S. A.	

Take of Cantharides Pulv.,	℥vj.
Spt. of Turpentine,	℥iiij.
Olive Oil,	℥iv. M.

Simmer over a slow fire for two hours; raise the temperature gradually to the boiling point; filter and evaporate over a water-bath until all the spts. turpentine is driven off; then thoroughly incorporate this solution with the cerate, immediately after the flies have been added, stirring continually until cool. The object of adding the spts. turpentine is for the purpose of more effectually dissolving the cantharidin, and the peculiar volatility of this article affords ready means of getting rid of it, after it has performed this function.

Several other cerates have been proposed for the officinal cerate; one of which directs to make a saturated decoction of flies in olive oil, by heat, straining and adding a sufficient quantity of wax to render it of a proper consistence; and another is, to make an ethereal extract of cantharides, and add twice the same quantity of wax: but neither of these will be likely to supersede the above cerate.

Various complaints have been made by physicians and their patients of the inefficacy of blisters, which are very embarrassing to the apothecary, especially when he is confident that the cerate has been prepared with great care, and that the cantharides used were of the first quality. Having devoted much attention to the matter, I have found that the principal reason of failures consists, in a great mea-

sure, upon the porous matter upon which the cerate is spread, viz.: sheep-skin, chamois-skin, muslin, linen, &c. The experience of others, as well as of myself, has taught me that the best method is to spread the cerate upon adhesive plaster cloth, oiled silk, and sheet gum elastic; but this last mode is rather too expensive. The former is attended with much less expense than sheep-skin, and prevents the absorption of the cantharidin, which is dissolved in the oil, and which, of course, is necessary to produce the desired result.

It is sometimes the practice, after spreading the blister, to spread upon its surface a small quantity of powdered cantharides, to insure the certainty of vesication; but this is unnecessary, especially if proper care has been used in preparing the cerate, and the flies used are of the first quality. It should be particularly impressed upon the mind of the apothecary, that he cannot exert too much scrutiny in the selection and in the manufacture of the various preparations of cantharides, as upon these often wholly depends not only the continuance of the life of a fellow being, but the reputation of both himself and of the physician.

ART. XXII.—ON PREPARED IRON.

To the Editors of the Journal of Pharmacy.

GENTLEMEN:—Having been led, by some remarks made by Professor Meigs on the subject of anæmia, to examine M. A. Raciborski's work, entitled "*De la Puberte et de l'Age Critique Cher la Femme, &c.*," I found that he recommended a number of the preparations of iron, but spoke more decidedly in favor of a preparation of pure metallic iron; as it proved, in his hands, much more successful than any other of the preparations, from its perfect insipidity, and from some peculiar inherent power. At p. 253, he says that "MM. Quevenne and Miquelard, who recommend the employment of iron thus obtained, regard it as combining the two advantages most sought after in ferruginous medication: very great activity, and absolute insipidity." Also, at p. 272, after referring to the lactate of iron, as prepared by M. Gelis at La Charité, that he "prefers the metallic iron, as prepared by the method of MM. Quevenne and Miquelard, as it has the immense advantage of being entirely insipid; and from this circumstance may be readily administered in any form: for this reason we have employed it for two years past almost exclusively, and always with complete success." It consists of metallic iron in a perfectly impalpable state; being a blackish powder, with a slight metallic lustre, and without odor or taste. It has a strong affinity for oxygen, and, from this circumstance, should be kept in a dry place, and in a glass bottle, with an air-tight stopper. It is prepared by placing a small portion of any of the oxides of iron (the higher oxides are most easily reduced) in a gun-barrel, and passing hydrogen over it when heated to a low red-heat. To reduce it perfectly, the process should be continued for some time. The oxygen of the iron unites with the hydrogen and forms water, which is

driven off in the form of vapor ; and the process must be continued until moisture ceases to be given off, which may be tested by holding a smooth polished surface of metal or glass at the farther extremity of the barrel. The gun-barrel should be closed at both ends by a cork, through which at one end an escape tube of glass or metal is passed, and at the other, the tube leading from the gas generator. It is necessary to observe the test, as to the escape of vapor, to insure the perfect reduction of the oxide of iron.

It may also be prepared by precipitating the protosulphate of iron in solution with oxalic acid. To a saturated clear solution of two parts of crystallized copperas, add one part of crystallized and pulverized oxalic acid, with constant stirring, until the whole assumes a yellow color ; after standing a short time, stir again, and set it aside for twenty-four hours. The yellow oxalate is then filtered off, dried, and exposed to a red heat in a crucible, when the oxalic acid, by decomposition, carries off the oxygen of the iron, leaving it in a finely divided metallic state. $\text{Fe O} + \text{C}_2 \text{O}_3 = \text{Fe} + 2\text{C C}_2$. With a lower heat the oxalate will still decompose, but then the iron is so finely divided, that when poured through the air, even if cold, it attracts oxygen so rapidly as to take fire, and burn to red oxide. The same may take place with the iron reduced by hydrogen, if the operation be conducted at too low a temperature.

M. A. Raciborski ascribes its activity to the fact that it more easily combines with the acids with which it comes in contact in the stomach, and is thus sooner conveyed into the circulation.

It may be administered in almost any form. MM. Quevenne and Miquelard recommend its administration in the forms of pastilles, made with chocolate, sugar, and gum ; and remark, that when thus mixed, they present no peculiar appearance, and their taste differs so little from that of ordinary chocolate, that it is necessary to have the attention

drawn to the iron in order to perceive it. From six to twelve of these are prescribed in the course of a day. It may also be given mixed with bread.

Yours, with respect,

ALEXANDER H. HOFF.

ART. XXIII.—ON THE DECOMPOSITION OF CARBONIC ACID AND THE ALKALINE CARBONATES BY THE LIGHT OF THE SUN. By JOHN W. DRAPER, M. D., Professor in the University of New York City.

For many years it has been known that the green parts of plants, under the influence of the sunlight, possess the power of decomposing carbonic acid and setting free its oxygen. It is remarkable that this, which is a fundamental fact in vegetable physiology, should not have been investigated in an accurate manner. It is not known that any one has yet attempted an analysis of the phenomenon by the aid of the prism, the only way in which it can be truly discussed.

It is the object of Prof. D.'s paper to prove, 1st. That the light of the sun is the true cause of the decomposition, the rays of heat and the so-called "chemical rays" not participating therein, as Graham, Johnston, and other writers on vegetable chemistry suppose. 2d. That it is the yellow light, or most luminous ray, that is mainly concerned. 3d. That leaves evolve not pure oxygen gas, but a mixture of oxygen and nitrogen in regulated proportions. 4th. That there is an extensive class of salts which is decomposed under the same circumstances, and therefore the phenomenon is rather to be attributed to a digestive than to a respi-

ratory process. 5th. That this digestion is brought about in the same way as the digestion of animals, by the decay of a nitrogenized body.

To show that the light of the sun is the cause of the decomposition, having obtained a motionless spectrum by the aid of a heliostat, he placed in the different colored spaces tubes filled with water impregnated with carbonic acid gas, and containing some leaves of grass. The decomposition presently commenced, and in the course of two hours a sufficient quantity of gas was collected. On examination, it was found that the tubes in the yellow, the orange, and the green light, contained most gas; that in the red, a much smaller quantity; and those in the blue, the indigo, and the violet, none at all.

But the [maximum of heat occurs in or beyond the red ray; the maximum of chemical action among the more refrangible colors, blue, indigo, and violet; and in these spaces the decomposition of the acid fails to go on.

From this he infers that it is the light of the sun, and the yellow light mainly, that is the cause of the phenomenon.

On causing leaves to decompose carbonic acid in water by the rays of the sun, and collecting the gas as it is evolved, it appears on no occasion to be pure oxygen, but a mixture of oxygen and nitrogen in variable proportions; from fifty to ninety per cent. of oxygen being found at different times, as is shown by explosion with hydrogen gas. But although there is this great variability in the proportion of the two gases evolved, a very simple law, which directs the progress of the decomposition, may be traced. On causing leaves to decompose a known volume of carbonic acid, the same volume of the mixed oxygen and nitrogen makes its appearance. From this it is to be inferred, that plants during this action do not only effect the fixation of carbon, as is commonly supposed, but with it they absorb a certain amount of oxygen also. When a leaf, exposed in carbonic

acid gas to the sunshine, has completed its function, it has appropriated or assimilated all the carbon, and with it a certain portion of the oxygen; the residue of the oxygen has been evolved, and with it a volume of nitrogen precisely equal in amount to the volume of oxygen appropriated by the plant.

This disappearance of oxygen and appearance of nitrogen are thus connected with each other: they are equivalent phenomena.

The emission of nitrogen is not a mere accidental result, but is profoundly connected with the whole physiological phenomena.

The elementary conditions under which carbonic acid gas is decomposed having been thus stated, Prof. D. passed next to the description of similar decomposition occurring in the case of saline bodies. It has always been a subject of surprise to chemists, that the powerful affinity by which carbon and oxygen are thus held together, should be so easily overcome at common temperatures. Even potassium cannot decompose carbonic acid in the cold. It might therefore be reasonably expected, that the energetic forces which bring about this change ought also to effect other remarkable decompositions. In fact the decomposition of carbonic acid is only one of a very numerous series.

Having boiled some distilled water to expel all gaseous matter, dissolve in it a small quantity of bicarbonate of soda. Introduce into a test tube some leaves of grass, fill the tube with the saline solution, which has been once more boiled to expel any air it may have obtained from the dissolving salt, and invert the tube in some of the solution in a wine glass, after having carefully removed all adhering bubbles of air from the leaves by a piece of wire, or in any other convenient manner. This arrangement, kept in the dark, undergoes no change; but if brought into the sunshine, bubbles of gas are rapidly evolved, and in the course of a

few hours the tube becomes half full. On detonation with hydrogen, this gas proves to be rich in oxygen.

Prof. D. made some attempts to discover how much oxygen could in this way be evolved from known quantities of bicarbonate of soda; supposing it probable that the second atom of carbonic acid being removed and decomposed, the process would cease: however, the results of his experiments indicated that the supposition he had formed was not correct. The process is not limited to the removal and decomposition of the second atom, but goes forward, the first itself being in like manner decomposed. From this it would seem that carbonate of soda itself should be decomposed; and experiment verified the conclusion: for on using that salt instead of the bicarbonate, the evolution of oxygen went on precisely in the same way.

As in these experiments a solid salt is decomposed, it is obvious that the function by which the leaves accomplish this is very different from that of respiration. It is not respiration, but a true digestion.

In the same way Prof. D. found that all kinds of soluble carbonates and several other organic salts, such as bitartrate of potash, citrate of soda, succinate of ammonia, &c., would emit oxygen.

It thus seems that the decay of some nitrogenized body in the leaf is essential to the digestive action of plants.

At this stage of the inquiry, a remarkable analogy appears between the function of digestion in animals and the same function in plants. Liebig has shown how, from the transformation of the tissues of the stomach itself, food becomes acted upon, and is turned into chyle, an obscure species of fermentation brought about by the decay of nitrogenized bodies. So in like manner in plants; the dissolution of a nitrogenized body brings about the assimilation of carbon. The facts seem to indicate, that the primary action of the light is not upon the carbonic acid, but upon

the nitrogenized ferment; and that the decomposition of the gas occurs as a secondary result. From this we may infer that chlorophyll, the green coloring matter of leaves, is the body which in vegetables answers to the chyle of animals; that it is derived from the decomposed carbonic acid through the eremacausis of albumen brought into the leaf, or of some compound of the elements of ammonia that passes up by the route of the ascending sap; and that the oxygen which disappears, disappears to bring about the eremacausis of that ferment. Under this point of view, the digestion of plants may be regarded as taking place in the following way:—There is introduced into the leaf some azotized body formed by the aid of ammonia that has passed through the spongioles: on this the sunlight acts, bringing about its decomposition by causing its union with oxygen: and now, if carbonic acid be present, the decomposition is propagated to its atoms; a part of the oxygen set free is expended in continuing the eremacausis of the ferment; the rest is evolved with an equivalent volume of nitrogen. The carbon thus set free unites at once with the elements of water, and chlorophyll results. But this chlorophyll undergoes continuous change under the action of the sun, and is as continually replaced; from it is formed gum, and finally lignin, and all the woody fibre of plants must have originally existed as chlorophyll, or passed through the green stage.

Proceedings of the American Philosophical Society.

ART. XXIV.—ON THE DOUBLE SALTS OF IRON.

BY MR. HEMINGWAY.

IN case 1, hydrated sesquioxide of iron was added to a boiling and concentrated solution of citric acid: it was observed to dissolve readily and in large quantity up to a certain point. A further addition left the solution turbid, apparently from excess of oxide. The mixture was now suffered to cool, was then filtered, evaporated to a treacly consistence, and dried in thin layers on well glazed earthenware: it separated in lamellæ of an acicular form and garnet color, scarcely soluble in cold water, but more readily in hot. Fifty grains of this salt, dried at 212° , were examined as to the quantity of oxide contained; it yielded fourteen grains = 28 per cent. Another portion, prepared after the same manner, yielded fifteen grains = 30 per cent.

In case 2, two several quantities of citric acid and hydrated sesquioxide of iron were kept at a temperature just sufficient to influence to combination until chemical action had ceased. The solutions were filtered, reduced, and dried, as in case 1. The salts separated in lamellæ, but of a short and broad sort. These were in like manner submitted to examination, when there were found in one 22 grains of oxide, and in the other 25 grains of oxide, per cent.

In case 3, I proceeded as in case 1, until the whole of the oxide derived by precipitation from four parts and a half of commercial sesquioxide had been added to five parts and a half of crystallized citric acid, and gentle ebullition was continued for fifteen or twenty minutes. In appearance much of the oxide remained unchanged; but it was evidently in combination, for on the addition of an alkali, it was totally and instantly dissolved. Owing to the variable quantity of real oxide existing in the article sold in the

shops, this experiment will not be uniformly successful. From an experiment which will be detailed in a subsequent part of this paper, this combination of oxide of iron and citric acid will be inferred to be in the ratio of 80 to 140, or of one equivalent of oxide of iron to two equivalents of crystallized citric acid.

In case 4, tartaric acid was substituted for citric, and subjected to the same treatment as described in case 1. As soon as the solution appeared turbid, one-half was removed, filtered, and dried at 212° , when one hundred grains were found to be impregnated with twenty-six grains of sesquioxide of iron. I did not repeat this experiment. To the remaining half, more oxide was added, and during the continuance of this part of the operation, a bulky hydrated bitartrate of iron was thrown down, very nearly resembling hydrated sesquioxide of iron, but differing in being totally soluble in alkalis. This precipitate was well washed, and dried at a gentle heat, which was raised towards the close of the process to 212° , and there kept until it ceased to lose in weight. One hundred grains were then heated to redness; it first evolved a suffocating inflammable vapor, then charred, and finally left me thirty-seven and a half grains of residue; the residue was dissolved in nitro-hydrochloric acid, precipitated with caustic ammonia, and washed. It was again heated to redness, when there were found to be thirty-six grains nearly.*

In case 5, acetic acid was digested at a common temperature with the hydrated oxide; union was readily effected, and by adding a little alcohol, and filtering, a beautiful solution was obtained, which, after the lapse of months, had only a very trifling deposit. A quantity of this solution was left to spontaneous evaporation in divided portions of say half an ounce each; the great bulk suffered decomposition

* It is stated in *Rose's Manual of Analytical Chemistry*, that ammonia completely precipitates sesquioxide of iron from its solution in aqua regia; an impression is now gaining ground that such a statement is inaccurate.

in drying, and I only obtained from a pint of solution about one scruple in a perfect state, and about as much more in a slightly imperfect* condition. The perfect salt is in lamellæ of a ruby color, and is soluble in water; ammonia precipitates oxide of iron from its solution, and the affinity between the oxide and acid is so trivial, that a little elevation of temperature is sufficient to overbalance it; in its dry state it will bear considerable heat without alteration; before examination, I held it some minutes very near to a common fire. The twenty grains of *slightly* imperfect salt were made up to twenty-five, and heated to redness; after fifteen minutes it was found to weigh eight grains: the remainder was preserved, as I did not like to part with the very little that was with difficulty obtained.

It appears to me that the nature of the precipitate soluble in alkalies, spoken of in cases 3 and 4, has been mistaken, and that they have been confounded with the oxide of iron itself. I some while ago met with an observation, but have failed to discover it since, to this effect—"The further addition of oxide (meaning addition after solution had ceased) causes the separation even of that portion which had been previously dissolved." A writer in the *Pharmaceutical Journal*, vol. i. p. 595, says, "Let the oxide be added in excess." M. Beral also directs that "rather more oxide should be added than the acid will dissolve." Whatever may be the value of these remarks, or how much they may conflict with each other, it is not my present business to inquire; I refer to them, because individually, and together, they do seem to imply that the fact of the oxide combining after solution had ceased, has been overlooked; and possibly to the prevalence of this oversight we may attribute much of the erroneous impression which so generally obtains. On a further comparison, I find that more of these

* The imperfection consisted in minute opaque dull spots, arising from disengagement of acetic acid and deposition of oxide.

results are not coincident with the opinions of some others: the writer in the *Pharmaceutical Journal*, to whose paper I have alluded, after a description of M. Beral's process, has the following—"The oxide of iron and citric acid combine in the proportion of forty parts of the oxide to seventy of the crystallized acid." The same is repeated by Dr. A. T. Thomson, in the last edition of his work on *Materia Medica*. I have repeatedly tried, without success, but with some uniformity as to result, to obtain a citrate of iron in scales so constituted; and as these proportions seem more fitly to apply to a compound of a different description, I would respectfully leave to these gentlemen to determine whether some error in computation may not have attended their investigations.

Regarding what has been stated in the preceding cases as matter of evidence, I see not how to escape from the conclusion, that in case 3, and latter part of case 4, we are presented with definite compounds of sesquioxide of iron with citric and tartaric acids; indeed, the constitution of the tartaric acid salts determined theoretically, and by experiment, agreed so very closely as to leave little room for dispute, and with the citric acid salt it is not much more discordant. The combination of the oxide with acetic acid is also to be considered as definite, inasmuch as all acid uncombined must have escaped during the evaporation. The quantity of oxide in twenty-five grains of the dry salt held a few minutes before the fire, was found to be nearly eight grains; but this estimate, owing to causes before mentioned, is a trifle too high: now, by a theoretical computation, a salt composed of four equivalents of acetic acid, and one equivalent of oxide of iron, should contain seven grains (rather more than less) of oxide in the same quantity; which, therefore, is probably the actual constitution of the article in question.

But it may fairly be doubted whether the products of the first and second operations have an equivalent constitution;

the examination did not corroborate such an idea: nevertheless, both a tercitrate and quadricitrate may exist, and the latter supposition gains support from the probability of acetic acid combining in the same proportion.

Sesquioxide of iron is not precipitated from its combination with citric and tartaric acids, by alkalies, alkaloids, earthy and some metallic oxides: according to Professor Brande, malic, mucic, kinic, and pectic acids lead to the same result. It has been found that double salts are formed, the precise constitution of which chemists are by no means agreed on: my own observations induce me to regard a binary series, the existence of which I will endeavor to demonstrate.

I took bicitrate of ammonia, and to its boiling solution added hydrated oxide of iron so long as a *greenish-yellow* color was retained, or so long as a distinct *red* absented itself: the solution must be boiled a few moments after each addition of oxide, or the effect will not be observed: when the process is complete, we have a combination of one equivalent of bicitrate of iron with two equivalents of citrate of ammonia. I obtained from one specimen so made, very nearly twenty-two grains of oxide per cent., and from another twenty-four grains: it dries in scales of a golden color.

Again, I took the precipitated oxide derived from four parts and a half of commercial sesquioxide, and boiled it with five parts and a half of crystallized citric acid, and after continuing ebullition a short time, it was supersaturated with caustic ammonia; it was then filtered, and cooled quickly, and I had a solution most difficult to evaporate without decomposition, but which, when dry, was perfectly soluble: one hundred grains of this salt afforded me nearly thirty-six grains of oxide of iron. I am sorry to say, another gentleman, to whom I gave a portion of this salt, only obtained thirty-four grains: pardon my attaching importance to this circumstance. It was my request that before exami-

nation notice should be taken that the salt was dry, for it is of so deliquescent a nature, that by long keeping, or transferring from one bottle to another, it absorbs water. I was sorry, therefore, to find, by his note to me, that he had tried the salt in the state I sent it to him. It is true, he remarked, that the salt appeared quite dry, but there might have been water, and my impression is, there was, and that his estimate is too low: under these circumstances, I think I am entitled to split the difference, and call it thirty-five.

I submit it to you whether I may not with reason infer that the real constitution of this salt is one equivalent of citrate of iron, and one equivalent of citrate of ammonia; that is,

Sesquioxide of Iron,	80	or	37.56
Citric Acid,	116	"	54.46
Ammonia,	17	"	7.98
	<hr/>		
Equivalent,	213		100.00

What now forces itself upon the mind—what but the conviction that these two compounds are the representatives of two distinct series of chalybeate salts? I anticipate the objection that I do not show by analysis that my theory is exactly confirmed. It is true, I come only very near the point, but I ask, let it be recollected that these salts are uncrystallizable; that on this account it is most difficult to keep the one series from interfering with the other; and this practical difficulty has been the cause, I think, of the uncertainty of opinion that is current among us. I show two compounds, one containing very nearly one equivalent of oxide of iron united to one equivalent of acid, the other containing one equivalent of oxide of iron united to two equivalents of acid: they have peculiar external characters, and are arrived at by different means. I point out how this “not quite” is to be explained, and I do think that in forming my opinion I have followed closely in the track

of inductive science ; I determined to rest the preceding part of my argument on what, with all the correction I have bestowed on it, still remains weak and defective, because, trusting to my formula, I had given to several gentlemen samples of a salt which proved to be less perfect than I have made it at other times. This difficulty, which opposes itself to the establishment of a superseries among citric salts, will not be felt when I come to treat of the analogous compounds with tartaric acid. We have been long familiar with an example of the inferior series of tartaric acid salts in the officinal potassio-tartrate of iron ; I therefore shall not now further occupy myself with them. The superseries is made evident in the following manner:—The bitartrate of iron resulting from the operation in case 4 is to be saturated with potash or ammonia ; the solution is to be then filtered and carefully dried in small quantities at a time ; I found ammoniacal salt to contain thirty-five grains of oxide : estimated theoretically, it is a fraction short of this quantity. Thus—

One equivalent of oxide of iron,	80	or	34.93
Two equivalents of tartaric acid,	132	“	57.64
One equivalent of ammonia,	17	“	7.43
	<hr/>		<hr/>
	229		100.00

To one or other of these two series, or to a mixture of both, the whole of the double iron salts, containing the sesquioxide, with which I am acquainted, are capable of being referred. The difficulty attending the manufacture of perfect salts of the superseries, is such as to render it improbable that they can ever become extensively used. The ammonio-citrate of commerce contains an average of thirty per cent. of oxide ; and in this state it is more permanent. A salt having this constitution is made without much trouble as follows:*

* The preparation of the hydrated oxide is an important point in the formation of these salts ; the London College orders the sesquichloride to be decomposed with caustic potash ; the Edinburgh directs the per-

Take a bisalt of any third constituent (bicarbonate of ammonia for example) made by adding a known quantity of citric acid to a similar quantity exactly neutralized with ammonia. This solution in its turn is to be saturated with hydrated oxide, which is accomplished by mixing the oxide gradually so long as it continues to be dissolved, avoiding any great excess. This formula admits of very general application by simply changing the acid, or the third constituent, but there are exceptions.

Dr. A. T. Thomson observes on the ammoniacal citrate, that it disagrees with some constitutions more than its congener, the potassio-tartrate. Guided by this opinion, I would direct attention to the compound of tartaric acid, iron, and potash, obtained by dissolving the hydrated bitartrate in a solution of the caustic alkali; if they be mixed

sulphate to be similarly treated with caustic ammonia. My own plan in detail differs from both of these. I make a solution of the sesquichloride according to the directions of the London College, adding nitric acid to insure the complete peroxidation of the iron, but instead of decomposing cold, diluted, and with a caustic alkali, I mix the solutions warm, somewhat concentrated, and use a carbonated alkali, and for these reasons: a moderate degree of heat is favorable to chemical action, and when conjointly with this, double elective affinities are in operation, decomposition is more complete, *and the liability to form a basic salt is considerably diminished*. Again, if the solution is very weak, the precipitate will be of so buoyant a nature that the process of ablution will be tedious. As soon, however, as the oxide is precipitated, longer retention of heat is absolutely mischievous, and large quantities of cold water must be added without delay, and the washing continued until the supernatant liquor is tasteless; the remaining water being drained off, the oxide is ready. To this it has been objected, that carbonic acid has no affinity for sesquioxide of iron. I apprehend that affinity does exist, although ordinarily it does not influence to combination; how else shall we explain the fact that solutions of sesquicarbonate of ammonia and bicarbonate of potash dissolve, under pressure of carbonic acid, sesquioxide of iron? That an affinity exists, I think is manifest; and that it prevents failures in making the hydrated oxide, I am inclined to believe: at all events, I have not formed a basic salt since I have adopted the plan of decomposing with carbonate of ammonia.

in such proportion as to keep the bitartrate slightly in excess, supersaturating at the end with ammonia, a salt will be obtained perfectly but slowly soluble in cold water, substantially consisting of tartaric acid, iron, and potash, and belonging to the superseries of double salts. The admixture of ammonia is advised, first, because it is impossible to separate any excess of potash, should there be any; and, secondly, because it is difficult to effect complete combination without such excess.

In pursuing this investigation, the present nomenclature of the Pharmacopœia seemed incapable of comprehending the double series which opened itself to view; and on searching for a better, I soon found myself on ground which was occupied by contending parties. The unsettled point consisted in this: Is the iron, or the third constituent, to become the adjective adjunct to the acid? In other words, is a compound of tartaric acid, oxide of iron, and potash, to be called potassio-tartrate of iron or ferro-tartrate of potash? Many, whose names command the greatest respect, continue to make the third constituent express the quality of the acid; and these have custom for their stay. On the other hand, it is contended that this nomenclature conveys erroneous impressions of the constitution of the salt; and the argument is thus summed up by Dr. Pereira in his *Elements of Materia Medica*: "The ferro-tartrate of potash is to be regarded as a double salt, in which tartrate of iron is the acid, or electro-negative ingredient, and tartrate of potash the electro-positive, or basic, constituent. On this view we comprehend why ferro-cyanide of potassium and the alkalies refuse to act on it in the way they do on the ordinary ferruginous salts until an acid be added." But the author, in adopting a nomenclature, leaves the double *protosalts* unprovided for. If, then, the electric condition of these oxides is such that we are obliged to regard them in the light of acids, rather than bases, it seems consistent that, with Berzelius, we should apply the usual termination

of acids to them. Acting on this suggestion, the class of double chalybeate salts would resolve itself into—

Ferric or *sesquioxide* salts,

Ferroso-Ferric or magnetic oxide salts,

And ferrous or *protoxide* salts.

The ferric salts would be subdivided into true ferric, or such as have *one* equivalent of oxide united to *one* equivalent of acid; and diferric salts, or such as have *one* equivalent of oxide united to *two* equivalents of acid. The name of the one would then be ferrico-citrate of ammonia; of the other, diferrico-citrate of ammonia.

London Medical Gazette.

ART. XXV.—ON MATICO.

BY MR. T. R. N. MORSON.

A Peruvian plant, the *Piper angustifolium* of Ruiz and Pavon, has recently been introduced into this country, under the native name of Matico. The leaves and flowering tops of the plant are the parts imported and introduced by Dr. Jeffreys, of Liverpool, to the notice of the profession as a most valuable remedy in diseases of the genital organs and rectum. He considers its activity to depend on its essential oil, and recommends its use in the form of infusion or decoction, in the proportion of from half-an-ounce to one ounce to the pint of water. Dr. Hunter Lane, also, has written on this medicine, and used it in various cases. The leaves are covered with fine hair, and have been recommended as a styptic; which property depends, I think, on their structure, and not on their chemical composition. The natives use this plant for similar diseases.

The leaves of matico, treated with boiling alcohol, yield a quantity of dark-green extract, almost entirely soluble in sulphuric ether; warm to the taste, and containing a notable quantity of vegetable wax, resembling in its properties the wax obtained from lac, and of which a very small proportion, dissolved in boiling alcohol, will cause it to solidify on cooling. Its active properties seem to reside in its resin and essential oil, as is the case with others of its family, for although it yields a large proportion of aqueous extract, (one-fourth of its weight,) yet this extract has little, if any, of the peculiar properties of the plant—it is slightly bitter and astringent, but possesses even these properties in no remarkable degree; it is therefore evident that the alcoholic extract or tincture should be employed, perhaps also the infusion.

Piper angustifolia or matico has been used by several practitioners, who speak highly of its useful properties in diseases of the mucous membrane; and I may, without expressing any very sanguine expectations of its obtaining a superiority over others of its family, recommend its being well tried, as it is the only instance of the leaves of a piper imported for medical use; and as we are well aware that the peculiar properties of plants reside in very variable quantity in different parts of their structure, it is desirable to be enabled to investigate them all, a knowledge of facts being in this matter very important.

Mr. Girdwood has favored me with a statement of several cases, in which it has been found useful.

One of the most interesting and remarkable of the plants, of this family remains to be noticed—the *Piper methisticum* ava or kava of the Sandwich or Tonga Islands: the name of *Piper inebrians* has also been given to this pepper from its property of intoxicating. The natives of these islands employ the root of this plant, occasionally only the leaves, but it is in its enormous root and stem that its properties chiefly reside. I am not aware of any chemical examination of this substance, although it certainly merits a

very attentive one. In the voyage of Captain Cook, you have a description of cava-drinking, but the best account of the employment of it is given by Mariner, in his interesting *History of the Tonga Islands*, in which he resided for many years; it is as follows :

“The root is split up with an axe, or any such instrument, into small pieces; and being thus sufficiently divided and scraped clean with mussel-shells, &c., is handed out to those in attendance to be chewed. There is now heard an universal buzz throughout a part of the company, which forms a curious contrast to the silence that reigned before; several crying out, ‘Give me some cava! give me cava!’—each of those who intend to chew it crying out for some to be handed to them. No one offers to chew the cava, but young persons who have good teeth, clean mouths, and have no colds; women frequently assist. It is astonishing how remarkably dry they preserve the root, while it is undergoing this process of mastication. In about two minutes, each person having chewed his quantity, takes it out of his mouth with his hand, and puts it on a piece of plantain or banana leaf, or sometimes he raises the leaf to his mouth, and puts it off his tongue in the form of a ball of tolerable consistence, particularly if it be dry cava root. The different portions of cava being now all chewed, which is known by the silence that ensues, a wooden bowl, of about three feet in diameter and about one foot in depth in the centre, is placed on the ground before the man who is to make the infusion. In the meanwhile, each person who sits at any distance, passes on his portion of chewed root, so that it is conveyed from one to another, till it is received by three or four persons, who are actively engaged going from one side to the other collecting it, and depositing it in the wooden bowl; it is not, however, thrown in promiscuously, but in such a way that each portion is distinct and separate from the rest, till at length the whole inside of the vessel becomes thickly studded, beginning at the bottom and going up on every

side towards the rim : this is done that a judgment may afterwards be formed of the quantity of beverage it will make, as each portion is disengaged from the leaf, the leaf is thrown anywhere on the ground.

“The cava being thus deposited in the bowl, those persons who had been busy collecting it retire to their places and sit down; the man before whom the bowl is placed, now tilts it up a little towards the chief, that he may see the the quantity of its contents, saying, ‘This is the cava chewed.’ If the chief thinks there is not enough, he says, ‘Cover it over, and let there come a man here.’ The bowl is then covered over with a plantain or banana leaf, and a man goes to receive more cava root to be chewed as before ; but if it be thought there is a sufficiency, he says ‘Mix’. The two men, who sit one on each side of him who is to prepare the cava, now come forward a little, and making a half-turn, sit opposite to each other, the bowl being between them; one of these fans off the flies with a large leaf, while the other sits ready to pour in the water from cocoa-nut shells, one at a time.

“Before this is done, however, the man who is about to mix, having first rinsed his hands with a little of the water, kneads together the chewed root, gathering it up from all sides of the bowl, and compressing it together; upon this the mataboole, an attendant, says, ‘Pour in the water,’ and the man on one side of the bowl continues pouring, fresh shells being handed to him, until the mataboole thinks there is sufficient, which he announces by saying, ‘Stop the water.’ He now discontinues pouring, and takes up a leaf to assist the other in fanning. The mataboole now says, ‘Mix it everywhere equally, and make it firm’—*i. e.* bring the dregs together in a body.

“Things being thus far prepared, the mataboole says, ‘Put in the fow;’ which is the bark of a tree stripped into small fibres, and has very much the appearance of willow-shavings. A large quantity of this fibrous substance, suf-

ficient to cover the whole surface of the infusion, is now put in by one of those who sit by the side of the bowl, and it floats upon the surface. The man who manages the bowl now begins his difficult operation. In the first place, he extends his left hand to the further side of the bowl, with the fingers pointing downwards, and the palm towards himself; he sinks that hand carefully down the side of the bowl, carrying with it the edge of the fow; at the same time his right hand is performing a similar operation at the side next to him, the fingers pointing downwards, and the palm presenting outwards. He does this slowly, from side to side, gradually descending deeper and deeper, till his fingers meet each other at the bottom; so that nearly the whole of the fibres of the root are by these means enclosed in the fow, forming, as it were, a roll of about two feet in length, lying along the bottom from side to side, the edges of the fow meeting each other underneath. He now carefully rolls it over so that the edges overlapping each other, or rather intermingling, come uppermost. He next doubles in the two ends, and rolls it carefully over again, endeavouring to reduce it to a narrower and firmer compass. He now brings it cautiously out of the fluid, taking firm hold of it by the two ends, one in each hand (the back of the hands being upwards;) and raising it breast-high, with his arms considerably extended, he brings his right hand towards his breast, moving it gradually onwards, and whilst his left hand is coming round towards his right shoulder, his right hand partially twisting the fow, lays the end which it holds upon the left elbow, so that the fow lies thus extended upon that arm, one end being still grasped by the left hand. The right hand being now at liberty, is brought under the left fore-arm (which still remains in the same situation,) and carried outwardly towards the left elbow, that it may again seize in that situation the end of the fow. The right hand then describes a bold curve outwardly from the chest, whilst the left comes across the chest, describing a curve nearer to

him, and in the opposite direction, till at length the left hand is extended from him, and the right approaches to the left shoulder, gradually twisting the fow by the turn and flexures of that wrist; this double motion is then retraced, but in such a way (the left wrist now principally acting) that the fow, instead of being untwisted, is still more twisted, and is at length again placed upon the left arm, while he takes a new and less constrained hold.

“Sometimes the fibres of the fow are heard to crack with the increasing tension, yet the mass is seen whole and entire, becoming more thin as it becomes more twisted, while the infusion drains from it in a regularly decreasing quantity, till at length it denies a single drop. He now gives it to a person on his left side, and receives fresh fow from another in attendance on his right, and begins the operation anew, with a view to collect what before might have escaped him, and so on, even a third time, till no dregs are left, save what are so fine, and so equally diffused through the whole liquid, as not to be thus separated.

“During the above operation, various people are employed making cava cups of the unexpanded leaf of the banana tree, which is cut into lengths of about nine inches, each piece being then unfolded, is nearly square, the two ends are next plaited up in a particular manner, and tied with a fibre of the stem of the leaf, forming a very elegant cup, not unworthy of imitation.

“The infusion of cava being now strained, the performance of which generally occupies about a quarter of an hour or twenty minutes, the man at the bowl calls out, ‘The cava is clear.’ The mataboole replies, ‘Squeeze out,’ alluding to the peculiar operation of filling the cups. Two or three now come forward and sit down near the bowl, bringing with them and placing on the ground several of the cups; one then rises and holds with both hands a cup to be filled, standing a little on one side, and holding the cup over the middle of the bowl, so that his body does not obstruct the

view of others. The man who manages the bowl, fills the cup by dipping in a portion of fow rolled together, and which, when replete with the liquid, he holds over the cup, compressing it so that the infusion falls into it, to the quantity of about the third of a pint. The one who has the cup now turns and stands a little on one side, with his face towards the chief, at the same time one of those who have been described sitting by the side of the bowl and employed fanning it, cries out with a loud voice, 'The cava is deposited' (*i. e.* in the cup;) the mataboole replies, 'Give it to ——,' naming the party who is to have it, who hearing his name announced, claps the hollow part of his hands together, to signify whereabout he is seated; the cupbearer the advances, and presents it standing, unless it be a chief when he presents it sitting."

Now, it clearly follows from this process, that vinous fermentation cannot take place, as the beverage is drunk immediately it is prepared; its effects, therefore, must be attributed to some narcotic property existing in the root, and which has never, I believe, been separated or investigated; it is, however, worthy of remark, that the peppers were formerly united in one great family with the hemsps, and that the latter are narcotic.

The root and stem of this plant abound in ligneous fibre, which, with starch, (also existing in immense quantity,) constitutes its great bulk. From a pithy centre, consisting of lax cells filled with starch globules, proceed plates of woody and vascular tissue, alternating with small cells filled with starch. For some magnified drawings of this root I am indebted to my friend Mr. Alfred White, the drawing of the plant itself is copied from an unpublished one in the collection of the late Sir Joseph Banks, in the British Museum.

If this root be distilled it yields a most agreeable essential oil, easily recognizable, and differing from that of other peppers. Treated with boiling alcohol, it yields an extract pungent to the taste, leaving a remarkable impression on

the tongue and throat, and from which I have succeeded in obtaining a crystallizable principle, in a state of great purity, which I consider as identical with piperine, although its mode of crystallization is somewhat different—a difference probably caused by the quantity operated upon. I hope shortly to be able to present to the society a chemical history of this substance, and the result of some trials made to ascertain its medicinal properties; for if we believe the accounts given by travellers, a strong infusion will produce stimulating and sedative effects, lasting for twenty-four hours, and leaving the patient in profuse perspiration—effects which render it eminently worthy of medical investigation. The abuse of it by the natives of the Tonga Islands, who are passionately fond of it, is said to render them thin and emaciated, and they are reported to use it to counteract great obesity; but all these statements require confirmation.

Mons. Lesson, in the *Bulletin des Sciences Medicales*, published about twenty years since, a curious notice of this plant, which he states is also employed in Carolina by the natives to prepare a drink which they call Scheaka: he mentions its use by them in rheumatism, and diseases of the genital organs, and terminates with the following observations:

“The English Apothecaries have recently introduced the cava root into all their shops, and extol the tincture as a remedy in chronic rheumatism, &c. Numerous ships are now employed in transporting this root to England.”

Where Mons. Lesson obtained his information I know not; he would certainly have found it difficult to obtain this root of any Apothecary or Chemist, although it has been employed in England without any very accurate experiments having been made.

Lond. Pharm. Journ.

ART. XXVI.—ON MR. PATTINSON'S MAGNESIA ALBA, AND
ON THE COMPOSITION OF THAT SUBSTANCE GENE-
RALLY. By GEORGE FOWNES, PH. D.

HAVING been presented by Mr. Morson with a specimen of the *magnesia alba*, prepared by the new and very ingenious process of Mr. Pattinson, described at the last Pharmaceutical Meeting, I lay before the Society a short notice of the result of its examination.

The color of the sample was beautifully white, and it yielded, after calcination, perfectly white magnesia; it was quite tasteless. When thrown into dilute hydrochloric or sulphuric acid, it dissolved with lively effervescence, the solution being quite complete, and the liquid free from turbidity. The solution, neutralized by ammonia, and mixed with oxalate of ammonia, remained quite unaffected, even after the lapse of many hours. The same solution mixed with excess of carbonate of ammonia, and warmed, underwent no change. Hence, I infer, the complete absence of lime. There is a minute trace of oxide of iron, but the quantity is exceedingly small and quite unimportant.

The analysis of this compound was effected by the following means:

A weighed quantity was exposed to a full red heat for fifteen or twenty minutes, in a covered platinum crucible; the residue, found on examination to be pure magnesia, gave the quantity of that substance present. The carbonic acid was determined directly by decomposing a known weight of the preparation by excess of sulphuric acid, with the usual precautions. The water was estimated by difference—100 parts were found in this manner to contain,

Magnesia,	-	-	-	-	-	41.6
Carbonic Acid,	-	-	-	-	-	36.0
Water,	-	-	-	-	-	22.4

100.

These numbers correspond almost exactly with those obtained in the analysis of a specimen of *magnesia alba*, prepared by myself in the usual manner, more than seven years ago—100 parts gave,

Magnesia,	-	-	-	-	-	41.2
Carbonic Acid,	-	-	-	-	-	36.0
Water,	-	-	-	-	-	22.8

100.

Magnesia alba appears, in fact, to be a substance of very constant composition, although from the mode of its formation, viz., the partial decomposition of the neutral carbonate first thrown down, by the water, in the old method of preparation, we might be led to think the reverse most likely to be true.

It is well known to those engaged in Pharmacy, that there are met with in commerce two varieties of *magnesia alba*; the one exceedingly light and bulky, the other much denser. This difference arises solely from the state of mechanical condition; the two kinds having a chemical composition sensibly the same, as will be seen by a comparative statement of their composition, determined as above.

	<i>Light Magnesia Alba.</i>			<i>Heavy Magnesia Alba.</i>		
Magnesia,	-	42.8	-	-	-	41.2
Carbonic Acid,		36.0	-	-	-	36.4
Water,	-	-	21.2	-	-	22.4
			100.			100.

A specimen of heavy *magnesia alba* prepared by myself, gave

Magnesia,	-	-	-	-	-	41.2
Carbonic Acid,	-	-	-	-	-	35.6
Water,	-	-	-	-	-	23.2

100.

It is improper therefore to apply, as is sometimes done, different names to the preparation.

The formula assigned by Berzelius to magnesia alba,



does not agree with the analytical results. Reckoned to 100 parts, it gives

Magnesia,	-	-	-	-	44.57
Carbonic Acid,	-	-	-	-	44.77
Water,	-	-	-	-	19.48

100.

Mr. Phillips, whose experiments coincide exactly with my own, has deduced the formula



which is probably the correct one.

Ibid.

ART. XXVII.—ON THE FORMATION OF HYDROCYANIC ACID FROM THE RE-ACTION OF NITRIC ACID ON ALCOHOL. By M. DALPAIZ.

THE author having had occasion to prepare some spirit of nitric ether according to the process of the London Pharmacopœia, observed that the product afforded a white flocculent precipitate with nitrate of silver, possessing all the characters of cyanide of the metal. The formation of hydrocyanic acid under the circumstances was an interesting fact; but M. Dalpaiz was not satisfied with having observed it: he was anxious to study the influence of varied proportions of acid and alcohol, and of different degrees of temperature, upon the phenomena observed.

He distilled, by the heat of a water-bath, a mixture of

Rectified spirit, sp. gr. .847,	360 grammes.
Distilled water,	180 “
Nitric acid, sp. gr. 1.384,	90 “

The products being collected in five separate parts all afforded precipitates with nitrate of silver, and these precipitates together weighed 0.65 of a grain.

A fresh mixture of

Spirit, sp. gr. .827, 100 grammes.

Nitric acid, sp. gr. 1.384, 100 “

Was gently heated in a large retort. Ebullition continued for two minutes, without the solution of nitrate of silver, into which the products were received, being rendered in the least degree turbid, but all at once there was so great a disengagement of hydrocyanic acid that the liquor instantly became milky and curdy. Unfortunately, a few seconds afterwards the retort broke, and the disengaged vapors were so highly charged with hydrocyanic acid, that the operator was obliged to quit the laboratory. The result of this experiment being inconclusive, M. Dalpaiz recommenced it, taking the precaution to moderate the action of the ingredients, by applying cold water to the retort. In this instance, the proportion of hydrocyanic acid disengaged was extremely small, and it is probable that none would have been formed if the action had been moderated still further. An elevation of temperature, therefore, is favorable to the formation of hydrocyanic acid.

M. Dalpaiz concludes his paper by observing that, of the numerous examinations he had made of specimens of commercial nitrous ether, with the view of ascertaining whether they contained hydrocyanic acid, nearly the whole had afforded negative results; but that he had always found a considerable portion of formic acid.

These researches of M. Dalpaiz have been very favorably reported upon by Messrs. Bernard, Derosé, and Chatin. The experiments which these gentlemen undertook in connexion with their report, show that hydrocyanic acid is produced in notable quantity during the action of nitric acid on fatty bodies. They state also, that when one part of alcohol and two parts of nitric acid are carefully distilled, the

product does not contain the least trace of any compound of cyanogen.

We may add, that the formation of hydrocyanic acid during the reaction of nitric acid on certain organic matters, is not a recent observation. In 1839, M. Gauthier de Claubry proved the presence of hydrocyanic acid in the alcohol left after the preparation of fulminates; and in the following year, M. Sobrero showed that it was also formed on distilling nitric acid with volatile oils, or even with some resins. M. Thenard also, some time ago, announced that this acid was one of the products of the reaction of nitric acid on sugar, gum, &c. Nevertheless, the observations made by M. Dalpaiz, with reference to the particular case to which he has alluded, are interesting and valuable.

Journal de Pharmacie and Pharm. Journal.

ART. XXVIII.—ON THE HEAVY CARBONATE AND CALCINED MAGNESIA. By Mr. RICHARD PHILLIPS, Junr.

MY attention having been directed to the above named preparations, I was induced to make some experiments upon them, the results of which may, perhaps, be interesting to the Society.

I found that upon one atom, or 123 parts, of crystallized sulphate of magnesia being boiled with one atom, or 59 parts, of sesquicarbonate of ammonia, the half atom of carbonic acid was expelled from the sesquicarbonate of ammonia, and a dense carbonate of magnesia was precipitated. This, however, when washed, dried, and calcined, lost its density.

I repeated this experiment with this difference, that I evaporated the precipitate and the sulphate of ammonia

formed, down to dryness, and the density of the carbonate of magnesia was increased ; but when the sulphate of ammonia and carbonic acid were expelled by calcination, the magnesia in this case also lost its density. It then struck me, that as the density of the carbonate of magnesia had been increased by evaporating it with the salt formed to dryness, that if the residue could be heated without expelling it, the density would be retained. In order to do this by the Pharmacopœia process, one atom, or 123 parts, of crystallized sulphate of magnesia was boiled with one atom, or 144 parts, of crystallized carbonate of soda, the whole was evaporated to dryness, and a carbonate of magnesia, of nearly equal density with that formed by the sesquicarbonate of ammonia, was left. The residual salts were then calcined, and afterwards allowed to remain in water until all the sulphate of soda was dissolved out. The magnesia, when washed, was found to be of the required density.

In the directions of the Pharmacopœia, the carbonate of magnesia is ordered to be calcined for two hours. I found that half an hour, at a good bright heat, all the carbonic acid was expelled. The sulphate of magnesia of commerce sometimes contains a very small quantity of a persalt of iron ; which quantity, however small, will give a reddish tinge to the calcined magnesia. This may be got rid of by dissolving the sulphate of magnesia in water, and adding lime-water until the color of reddened litmus paper is restored ; the solution must then be allowed to stand for twenty-four hours, when peroxide of iron, and any excess of lime which may have been employed, will be precipitated. The most delicate test that can be employed for the presence of iron is the ferrocyanide of potassium. I may, perhaps, also state, that I have found the sulphate of magnesia, which is sold in the shops, generally adulterated with sulphate of soda, and that, if pure, 100 grains of it ought to yield 16.2 of calcined magnesia.

Pharmaceutical Journal.

ART. XXIX.--ON RADIX SUMBUL, THE PERSIAN MUSK ROOT.

By H. REINSCH and M. BUCHNER.

NOTWITHSTANDING the great intercourse with Persia, this interesting root appears to be as yet entirely unknown in Europe; the only notice of it is given by Erdmann and Ledebour in Dierbach's edition of the botanical portion of Geiger's "Pharmacy." It is there stated to be imported from Bokhara into Russia, and is said to resemble the white Hellebore, and to have a blackish-gray epidermis (which does not agree with the roots now under consideration), and to contain much mucus and an acrid resin having the odor of musk, but no essential oil, although the water distilled from it possesses a smell of musk. This root is not mentioned in any other pharmacological work, and even the "Pharmacopœia Persica," which appeared in Paris in 1681, contains no reference to it. It may now be had in Nuremburg and Hamburg at a very cheap rate. According to information supplied us by one of the importers, it comes from Persia by way of Nischnei-Novogorod to Europe, and is employed in Persia, on account of its odor, against mephitic vapors.

The root is very thick, fleshy, tuberose, and cut into discs of the diameter of from 1 to 4 inches, and in height from $\frac{1}{2}$ to $1\frac{1}{2}$ inch. From the pieces of the upper part of the root, it is evident that the stem can scarcely be 1 inch in thickness. The root divides downwards in a few thick branches, and appears to have very few lateral fibres; the epidermis is thin, grayish-brown, somewhat wrinkled, *i. e.* provided with diagonal furrows or corrugations; the parenchyma appears in the fresh state to be very fleshy, but dried it is cellular, foliaceous, and containing very numerous globules

of starch, the freshly divided surface is yellowish-white, and is rendered dark blue by iodine, but as the root occurs in commerce the surfaces appear of a dirty brownish-yellow color, and partly covered with exuded and dried milk-sap. The taste is spicy, bitter, of considerable duration, but not disagreeable; but the most peculiar character is undoubtedly its odor, which at some distance resembles musk so strongly and distinctly, that several pharmacutists whom we asked to smell the paper in which a slice of the Sumbul root was folded in order to have their opinion, unanimously pronounced it to be musk; but when held near, and especially with a fresh section, the odor resembles at the same time that of *Apium* or somewhat that of *Angelica*. The odor adheres very strongly to linen, and is not entirely removed by washing; the taste is slightly sweet, musk-like, subsequently aromatic. Since the odor of musk is increased by ammonia, the authors placed some fine sections of the root in a glass, and moistened them with very dilute solution of ammonia, but now another aromatic odor appeared instead of the musky one. Dilute sulphuric acid also produced a different odor, which might almost be termed a rotten one; but on dropping a little *concentrated* sulphuric acid on a slice of the root, a very strong and decided odor of valerianic acid was produced, and the liquid became of a beautiful wine-red color, which after a few hours passed into brown, while the smell of the acid still continued.

Reinsch submitted the root to analysis, and obtained the following result:—

Water	-	-	-	-	-	-	-	0.130
Essential oil, not smelling of musk	-	-	-	-	-	-	-	

1. *Extract with Æther.*

A nearly-colorless balsam	-	-	-	-	-	-	0.126
A waxy substance	-	-	-	-	-	-	0.002

2. *Extract with Alcohol of 0.8194 spec. grav.*

Balsam	-	-	-	-	-	-	0.002
Aromatic resin	-	-	-	-	-	-	0.003
A bitter substance, soluble in alcohol and water	-	-	-	-	-	-	0.010

3. *Extract with Alcohol of 0.9335 spec. grav.*

Bitter substance, soluble in water with vegetable gelatine and vegetable acid salts	-	-	-	0.064
A bitter yellow coloring substance, soluble in alcohol	-	-	-	0.040

4. *Extract with Water.*

Gum, soluble in cold water	-	-	-	0.082
Starch and salts	-	-	-	0.284
Gelatinous sediment	-	-	-	0.072

5. *Extract with Solution of Potash.*

Starch (in combination with the fibre)	-	-	-	0.100
Insoluble fibre	-	-	-	0.076
				<hr/>
				0.991
Loss	-	-	-	0.009

The most interesting substance in this root is the balsam which ether extracts, which resembles in consistence and color copaiva balsam. It possesses a burning aromatic taste but only a faint musky odor, which, however, is strongly developed when the balsam has been placed for some time in contact with water; it differs very decidedly in its properties from most other vegetable substances: for instance, it dissolves in sulphuric acid with a splendid blue color. This reaction is best obtained when a concentrated alcoholic solution of the balsam is dropped into sulphuric acid diluted with its equal weight of alcohol.

When the balsam is heated alone in the retort, a clear yellow oil, having a taste of peppermint, distils over at the commencement, after which the residue in the retort is converted into an indigo-blue mass, and finally an emerald-green oil passes over.

The balsam is easily soluble in solution of potash, and forms with it a crystalline mass; when this is dissolved in water and decomposed with sulphuric acid, the balsam is re-obtained apparently unaltered; but if some water is

poured over this, and it is then placed aside for a few days, it becomes partially converted into beautiful transparent prisms, which have a most powerful odor of musk. Some other constituents of this root likewise appear to be extremely interesting in a chemical point of view.

The root, therefore, is in every respect similar to Angelica, and is certainly derived from some large umbelliferous plant; but it is of a brighter color, with fewer ramifications or fibres, less spicy in taste and more bitter, and has a totally distinct odor. It might perhaps be supposed that the odor had been artificially communicated, perhaps by packing it between empty musk-pods; and this suspicion might receive additional support from musk being consumed by the Persians in considerable quantity, not only as an article of luxury, but also as medicine, for we find in the Persian Pharmacopœia a considerable number of compound medicines of which musk forms a constituent. The authors, however, are not inclined to this opinion, because the odor is not merely externally adherent, but is also disengaged from fresh sections of the root. Undoubtedly it is closely allied to Angelica in its medical properties.

Chemical Gazette, from Buch. Rep.

ART. XXX.—ON OPIUM.

M. TEXIER states that the differences which are found in the qualities of the various opiums from the same soil, are not solely owing to the composition of the collected juice of the poppy, but rather to the different states of the atmosphere during its collection.

It is well known that the opium is collected by forming some horizontal incisions round the capsules, and allowing the juice to flow slowly from it for twenty-four hours. If, during this operation, any rain, fog, or moisture should occur, the quality of the opium suffers; a few hours' rain suffices entirely to destroy the opium harvest. For this reason the poppy is cultivated in Asia Minor, only on the large table-lands of Cappadocia and of Phrygia, in the neighborhood of the town of Karahissar; it is not an excessively hot country that is favorable to the cultivation of opium, but it is requisite to be nearly certain that there should be no rain from the flowering season of the poppy until the opium is collected. The poppies are cultivated in Asia Minor on irrigated lands.

One of the causes of the bad quality of the opium collected in Asia Minor of late years, is the sophistication with Armenian bolus and other earths to which it is submitted.

Ibid, from Comptes Rendus.

ART. XXXI. — ON MADDER. By M. GIRARDIN, Professor of Practical Chemistry at the Municipal School of Rouen.

(Concluded from page 51.)

5. *On the Adulteration of Madders and Methods of detecting them.*

ON account of the high price of madder, and especially from the facility of introducing into this substance, which is sold in the form of powder, foreign pulverulent matters, which the most practised eye cannot detect, this root is subject to a number of sophistications which cannot be too fully exposed.

There are two kinds of adulterations. Sometimes earthy or mineral substances are incorporated with the powder of madder; sometimes vegetable substances are added to it, the color of which resembles that of madder.

1. *Adulteration by Mineral Substances.*—The mineral substances which have been introduced, or which are still found in ground madders, are brick-dust, red and yellow ochre, yellowish sand, yellowish clay or argillaceous earth. A madder which contains earthy substances grates between the teeth when chewed.

A small quantity of such a madder, for example from 25 to 30 grms., introduced into a large glass globe and diluted with 5 or 6 litres of water, quickly deposits the greater portion of the earthy substances at the bottom of the vessel. When the suspended matter is decanted, and the deposit agitated with a fresh quantity of water, the earthy substances are isolated and may be examined.

However, to determine the proportion, more exact processes must be had recourse to. The best is that of calcining, at a red heat, in a platinum crucible.

5 grms. of the madder under examination are first dried completely at 212° Fahr., and are weighed with great exactness, and then put into the platinum crucible, which must be weighed beforehand. The crucible is shut and heat gradually applied. When perfectly incinerated, the crucible is taken out of the furnace and left to cool, and then weighed. Its weight being deducted from the quantity employed, the difference gives the proportion of cinders obtained.

These cinders are composed—1st, of the fixed mineral matters contained in the root; and 2d, of the earthy substances, foreign to the chemical constitution of the root, and which have been accidentally or fraudulently mixed with the madder.

Some experiments which I made with M. Labillardière on a large scale, in 1828, showed us that madder which is



very pure, and quite free from its epidermis or any foreign earthy matter, and dried with care, gives by incineration 5 per cent. of ash; that the Lizaris of Provence, stripped of its pellicle, gives on an average 8.80 per cent. ash.

According to M. Henri Schlumberger, 100 parts of Alsatian Lizaris, washed in distilled water, and dried at 212° , give 7.20 per cent. of ash; whilst 100 parts of Lizaris of Avignon, prepared in the same way, give 8.766.

According to M. Chevreul, 100 parts of Lizaris from the Levant, dried at 212° , give 9.80 ash.

When an Avignon madder, SFF, (the mark most generally used,) subjected to the test of incineration, gives a greater weight of ash than 5 per cent., which I have taken as the mean of numerous experiments, the excess must be attributed to the presence of foreign earthy or sandy matters, either arising from adulteration or a careless preparation of the powder.

When the excess is only from three to four-hundredths, it is probably owing to some fault in the preparation of the madder, the manufacturer not having separated the epidermis (which is always coated with the earth which surrounds the roots) carefully enough by grinding; but when the excess is above 4 or 5 per cent. or more, it is the result of fraud.

The madders obtained from the merchants give very variable results with respect to the proportions of ash which they furnish, as the following table shows:—

	Per cent. of Ash.
On 6 trials the mulle madder of Avignon gave - - - - -	4.00
On 7 trials the madder SF of Avignon gave from - - - - -	12.40 to 20.00
On 18 trials the madder SFF of Avignon gave from - - - - -	7.40 to 23.00
On 4 trials the madder SFFRP of Avignon gave from - - - - -	12.00 to 16.00

On 3 trials the madder SFFP of Avignon
gave from - - - - - 10.00 to 10.80

On 7 trials the madder EXTF of Avignon
gave - - - - - 10.00

When in testing a madder by incineration, the quantity operated on amounts to 5 grammes, the weight of the ash must be multiplied by 20 in order to bring it to 100 parts, and from the figure obtained 7 parts, representing the mean weight of ash p. c. furnished by good madder subtracted; the surplus then represents the proportion of earthy matters or of sand added by the manufacturer. Consequently, a madder furnishing 16.40 per cent. of ash will contain 9.40 per cent. of foreign matter.

2. *Adulteration by Vegetable Substances.*—The vegetable substances which are introduced into the madders are powders of little or no value, such as sawdust, almond shells, bran, the bark of the so-called pine-tree, mahogany wood, log-wood, sandal wood, and fir tree wood.

The sophistication of madders by these different substances is much more prejudicial to the dyer than that by mineral substances; for besides diminishing, like the latter, the quantity of coloring matter of a given weight of madder, they also injure the dye, either by absorbing the coloring matter or by preventing the colors becoming so bright.

Unfortunately the means of detecting this new kind of fraud are neither so rigorous nor so simple as the process for determining the presence of mineral matters. It is extremely difficult to ascertain with what kind of vegetable substance a madder has been adulterated; it is mostly only possible to ascertain that there is a mixture. This, however, is the most important point, and the practical man, after all, only needs to know the tinctorial worth of the madder which he buys.

Many methods have been proposed to determine the tinctorial value of madders and the absolute quantity of the coloring principal which they contain; but the greater part of

them have the fault of being too exact, or too difficult and too long of execution. I will now point out those which I think preferable, and which I have long since employed in the examination of madders which I continually make.

One of these means consists in determining the coloring power by means of Labillardière's colorimeter; the second, in determining this coloring power, as well as the solidity and brilliancy of the colors, by an operation of dyeing. The third experiment is to ascertain the absolute quantity of the coloring principle.

These different experiments are always made comparatively, by taking for type a madder prepared with all possible care, and having the same marks as that under examination. As with indigo and other tinctorial substances, a single experiment is not sufficient; and by reason of the difficulty there is of correctly verifying the value or the quality of the madders, it is indispensable, in order to decide with any certainty, to check the experiments by each other. This is the only way of obtaining satisfactory results.

1. *Determination of the coloring Power by the Colorimeter.*—The following is the mode of operation with the colorimeter of Labillardière. The type madder and the madder under examination are dried at 262° Fahr., and an account is kept of the respective quantities of hygrometric water they contain.

25 grms. of each sample are then mixed with 250 grms. of water at 68° . After three hours of contact, the whole is thrown upon a linen cloth. A second maceration is made with the same amount of water and for the same length of time. The madders are then washed with 250 grms. of cold water, dried at 212° , and weighed, in order to ascertain the proportions of soluble, saccharine and mucilaginous matters which they have lost by these preliminary washings, which only remove an insignificant quantity of red coloring matter.

5 grms. of each of the two madders are then introduced

into little glass globes with 40 parts of water, and 6 parts of very pure alum, boiled for a quarter of an hour, and the boiling liquids filtered. The grounds are washed with 2 parts of hot water. Two other decoctions, similar to the first, are made, and each time the residue is washed with 2 parts of hot water. The products of the three decoctions are combined, and the liquids from the two samples of madder compared by the colorimeter.

Without doubt this examination with the colorimeter is not sufficiently accurate, but it affords valuable indications, which, joined to those resulting from the following tests, enable us to give a decided opinion.

2. Determination of the Tinctorial Power by Dyeing.—In order to estimate the value of a madder by dyeing, a madder of superior quality must be taken as a type of comparison, with which skeins or mordanted calicoes have been already dyed, by acting with determinate quantities of powder, tissue and water. Patterns for comparison should be prepared in the following manner:—

Calicoes are selected, mordanted for red and black, and well-cleansed in a dung-bath. They are divided into pieces 5 centimetres square, and are dyed with proportions of madder increasing progressively from 1 grm. up to 10 grms., so as to have a scale of 10 shades, of which the gradations represent each a known weight of madder. The garancing of these pieces is practised in the following manner:—In a great copper basin, with a flat bottom, which is covered with a layer of hay, are placed three or four glass jars with wide mouths, containing from $1\frac{1}{2}$ litre to 2 litres. The basin is filled with ordinary water heated to 104° ; then into each of the glass jars the piece of mordanted calico is introduced, the madder weighed with care, and lastly, three-fourths of a litre of distilled water heated to a temperature of 104° . A thermometer is inserted in the water-bath, which is heated slow enough for the water not to reach 167° until after an hour and a half, avoiding carefully alternations of tempera-

ture. After this it is made to boil for half an hour, the samples are taken out, rinsed in cold water and dried. Each dyed piece is cut in half; one-half is preserved as it is, the other is subjected to the following clearings:—We begin by a soap-bath at 122° , made with $2\frac{1}{2}$ grms. of white soap to each litre of water. After it has been half an hour in this bath, the cloth is carefully rinsed in cold water. A fresh soap-bath is given, to which is added half a gramme of salt of tin, and which is kept at boiling point for half an hour. It is washed and rinsed. The well-rinsed samples are dried with care and preserved from the light.

When a series of tints of two different states have been thus prepared, that is to say, a dye without and with clearing, it is very easy to ascertain the comparative value of an unknown madder. In fact it is sufficient to take 10 grms. from the barrels, and to go through the preceding operations on 5 square centimetres of suitably-mordanted calico, and to compare the dye obtained, before and after the clearing, with the ten samples. If, for example, the shade is equivalent to No. 5 of the madder, it may be concluded that the unknown madder is inferior by half to the madder-type, since $10 : 5 :: 100 : x = 50$.

Whatever vegetable powders may have been fraudulently introduced into the madders, whether tinctorial or inert, they can never lead to error as to the true tinctorial value of the mixture, inasmuch as the colors which they afford, and which saturate the mordants at the same time as the red principle of the madder, cannot withstand the action of the clearings as the latter does; they *run*, as is said, in the soap and tin-baths, and in the end there only remains the color from the madder upon the tissue. The clearings are therefore necessary to show the solidity and vivacity of the tints obtained.

Instead of printed calicoes, skeins of oiled and mordanted cotton may be used in the state in which they are prepared for dyeing Turkey-red. In this case skeins of the weight of

10 grms. are taken and dyed with different weights of good madder, from 20 to 30 grms., in order to obtain a scale of ten distinct shades.

This test is that which I have employed since 1831, and which has been since adopted in all our print-works of Rouen and Bolbec, where my pupils have introduced it. It differs very little from that which was published in 1835 by M. H. Schlumberger of Mulhausen.

3. *Determination of the Quantity of the coloring Principle.*—The most exact process hitherto published is without doubt that made known by M. H. Schlumberger in 1838, as modified by M. Scheurer. But this process, which is founded on the solubility of the red coloring principle of the madder in weak acetic acid, a fact pointed out as early as 1829 by an anonymous chemist, is unfortunately too sensitive, and requires too great a degree of skill in the manipulation to become general.

The following is the method which I have long been accustomed to employ:—50 grms. of madder are diluted with 50 grms. of concentrated sulphuric acid. The whole is left in contact for some hours; too high a temperature should be avoided; the charcoal obtained is mixed with water and thrown upon a filter; it is then washed until the water passes through quite insipid; and next dried at a temperature of 212° Fahr. in Gay-Lussac's water-bath. This charcoal is reduced to a fine powder and macerated for two hours at three distinct intervals with cold alcohol containing a little ether, in order to free it from a fatty matter which it retains. The powder is boiled in alcohol of 0.834, at three different intervals, employing each time about 250 grms. of alcohol. When this is no longer colored by ebullition, the alcoholic liquors are mixed, and distilled in a small glass retort to the consistence of a syrup, and the concentration of the liquid completed in the water-bath in a weighed porcelain crucible. When the extract is perfectly

dry, its weight is taken. This represents the proportion of red tinctorial principle contained in the madder.

This process is rather long; it does not give, especially on a small scale, the absolute proportion of coloring principle contained in the madder; there is a slight loss, but by acting comparatively a sufficient approximation is obtained.

Such are the different methods for ascertaining the quality, the purity, or the adulteration of the madders. In most cases calcination is sufficient, and rigorously, calcination and the test by dyeing made conjointly, allow the practitioner to form a positive opinion of the value of the madders submitted to examination.

Considering the minutiae and the number of operations which it is necessary to have recourse to, in order to form a just estimate of the relative worth of the madders, it is evident that an examination of the madders by simply looking at them, as is customary with the merchants, can afford no precise information, and must indeed lead in most cases to erroneous conclusions. The process in use amongst merchants consists in spreading samples of madders of about 30 to 40 grammes side by side on a sheet of paper, which small heaps are flattened and their surfaces rendered smooth with the back of an ivory spatula. The samples are then placed in a cellar, or some moist situation, where they remain from twelve to fifteen hours. At the expiration of this time the quality is judged of according to the brightness and tint of the powder.

But as M. H. Schlumberger has already observed, this method does not even approximately show the richness of color of the madders, since a somewhat long contact with the air is sufficient to render them darker, and many circumstances may change their tint, without thereby causing their tinctorial value to vary. On the other hand, the old madders, of a dull tint, may be far superior to others of a more beautiful color. The merchants' and brokers' method of trial often places the manufacturer in a false position, by

obliging him to brighten the tint of his powders, in order to make them more saleable, and that sometimes to the injury of the tinctorial power; thus facilitating the adulteration of the madders by mixture with foreign substances, suitably colored and pulverized, which serve to heighten the tint of the powder; and it is impossible to ascertain the presence of these mixtures by exposure in the cellar, of which I have often had proofs. I have purposely made mixtures of madder, of powders of mahogany and of sandal wood in known proportions, and these mixtures, when tried by the merchants, who thought themselves very skilful in their estimation of madders, by the above process, were considered by them to be pure madders of first quality!

Testing of the Garancines.—The quality of the garancines varies, as I have already stated, considerably. A manufacturer sometimes sends a series of from fifteen to twenty barrels of excellent quality, and fifteen days later sends another series which is worth from 20 to 25 per cent. less than the preceding one. It often happens that in the same series good and bad garancine is found; each barrel therefore of this product should be tested comparatively as far as possible. It is now customary for the seller to take back the garancines which he had delivered to the calico-printer, allowing for the pieces spoiled, when the quality of the powders was inferior to what it was represented.

The testing of garancines is made on a large and on a small scale. In the latter case the following is the process we adopt:—

Samples are taken from the barrels as they arrive, taking care to cork the labelled bottles in which they are inclosed as quickly as possible, in order that they may not dry, which in summer time especially causes an amelioration of from 5 to 6 per cent. in a few days, on account of the water which evaporates.

A piece of calico, printed in stripes of red, violet, puce and garnet, is taken (black is useless, as all the garancines

produce that well,) not gummed as usual, and dried. As many decimetres are cut from it as there are garancines to be tried, and the pieces are marked by notching them with the scissors: the notches must correspond with the numbers on the bottles.

From 1.9 grm. to 2 grms. of garancine, known to be good, is weighed off to serve as standard, and for the garancines to be tried, we take 1, 2, 3, 4, 5, 6, 7, 8, 10 times more or less of 1.90 or 2 grammes, according as they cost 1, 2, 3, 4, &c. more or less than the standard sample. As the samples are weighed, they are each put into a jug with a wide mouth holding half a litre, with from 2 to $2\frac{1}{2}$ decilitres of water containing some oxalic acid, in the proportion of 15 centigrms. to a litre. The jugs are numbered so as to correspond with the samples of the garancines and strips of calico. They are placed in a water-bath, in a copper boiler with a flat bottom, the pieces of printed calico are immersed in them, and dyed as in testing the madders, regulating the fire so as to raise the temperature to 158° in an hour and a half, and keeping it at the boiling-point for half an hour. After the process of dyeing, the samples are removed as quickly as possible from the vessels, rinsed in water and beaten, and then dried or previously immersed for five or six minutes in a bran-bath at 167° . When dry they are compared, and in this manner the relative tinctorial value of the garancines may be estimated as nearly as possible.

In employing calicoes, which present at the same time stripes mordanted for red, violet, puce and garnet, it is seen at once whether the garancines can be employed with advantage for all the colors, or for what tints they are most suited. I have already stated that the same garancine does not always suit equally well for red, puce and violet.

Lond. Chem. Gaz. from Journ. de Pharm.

ART. XXXII—ON THE PREPARATION OF MERCURIAL OINTMENT.

By M. FOSSEMBRAS.

THERE are few pharmaceutical preparations that have given rise to so many investigations and theories as mercurial ointment. So much has been said on the subject that anything new may at the very outset appear fastidious and useless.

It is with some hesitation therefore that I publish these considerations, which have suggested to me the employment of a process which allows 8 lbs. of mercurial ointment being prepared in less than one hour. The process which I employ consists simply in the use of rancid fat, but it is so easy of execution that I have thought it right to rescue it from the oblivion into which it has fallen. Only 25 grms. of this substance are requisite for a pound of ointment, and so small a quantity is not capable of communicating injurious properties to a medicine which can never be preserved for any length of time from becoming rancid, and which is scarcely ever employed in any other state.

The requisite conditions for a prompt division of the metal may be reduced to two,—1st, dividing by trituration; and 2d, preventing the reunion of the separated particles. The first condition is always complied with, but the second scarcely ever. In fact, fresh lard not possessing any agglutinative properties can for that very reason not retain the mercurial powder and prevent the reunion of its particles. Fresh lard therefore is incapable of extinguishing mercury in a perfect manner.

It may perhaps be objected, that a continued vigorous working is always followed in a short time by success; to which I would answer, that I have never seen the work terminated before the fat has acquired a rancid odor.

But why is this state of alteration of the fatty matter favorable to the extinction of the metal? The first thing that attracts our attention in rancid fat is its consistence. When it has been allowed to attain that degree of alteration at which it still possesses a certain softness, it will be perceived that it has acquired very marked agglutinative properties. When agitated in the mortar, it adheres strongly to the pestle. If a certain quantity of mercury is now poured into this triturated mass, and agitation continued, the metal is divided immediately, and the adhesion of the fat which surrounds each of the particles will necessarily prevent their reunion.

I will now relate the facts which prove the truth of the above considerations. I had exposed for some months to a moist atmosphere about a pound of fat; when I employed it, it was not hard, but it adhered strongly to the fingers. I took 200 grms., and triturated it for some minutes in a marble mortar, when it became soft like thick honey; I then poured 4 lbs. of mercury in portions of 300 grammes, and five minutes of trituration always sufficed for the complete extinction of the metal. After the introduction of the fourth portion the ointment had become somewhat hard, but the addition of a little oil of sweet almonds allowed of the operation being easily continued. In this manner I was enabled to incorporate 4 lbs. of mercury in the 200 grms. of fatty substance. Not the least metallic particle could be detected with the lens throughout the whole mass. I then added the 1800 grms. of recent lard in a state of semifusion, and after a quarter of an hour's trituration I obtained a perfectly homogenous ointment, in which the mercury was extinguished most completely.

N.B. The above process is not very new, but it is eminently successful. It is similar to the method of MM. Coldefy and Simonin, which consists in extinguishing the mercury in a small quantity of lard, which has been prepared by melting it, pouring it into water, and exposing it to the action of the atmosphere.—*Journ. de Pharm.*

ART. XXXIII.—RESEARCHES ON NARCOTINE AND THE PRODUCTS OF ITS DECOMPOSITION.

By Prof. WÖHLER.

THIS investigation was undertaken in the hope that the products of decomposition of the vegetable alkaloids, of which as yet very little is known, might throw some light on the peculiar constitution and mode of origin of this remarkable class of bodies. For several reasons narcotine was first selected. Exposed in the presence of an acid to oxidizing influences, it is decomposed into an acid containing no nitrogen, into an organic base and carbonic acid. This decomposition is best effected by heating a solution of narcotine in excess of dilute sulphuric acid, with finely pulverized hyper-oxide of manganese as long as any carbonic acid is given off. The new acid has been called opianic acid; the new base cotarnine.

1. *Opianic Acid*.—This was discovered some years ago in conjunction with Prof. Liebig. It subsides, on the cooling of the above mixture, as a yellow mass of minute crystals. It is readily obtained perfectly colorless by treatment with hypochlorite of soda; it crystallizes in thin narrow prisms, which are frequently ramified, arborescent, or united in concentric radiating groups; it has a very faintly bitter taste, is slightly soluble in cold water, but much more soluble in boiling water, so that a hot saturated solution solidifies on cooling to a mass of crystals. It melts at 284° without parting with any water; it is not volatile, but creeps up the sides of the vessel so much that it distils over; it burns with flame; its vapor possesses an aromatic odor, and calls to mind that of heated narcotine.

It undergoes a very remarkable change on being submitted to the influence of heat. The melted acid remains soft

and transparent for several hours; it then becomes white and hard, beginning at the surface, but so slowly that a transparent soft nucleus may be found after several days in large fused masses, resembling in this respect arsenious acid. It has now become insoluble in water and alcohol, nay even in dilute alkalies. If water be added to it while it is still clear and amorphous, it becomes milk-white, and on boiling is converted into a white earthy mass, of which extremely little dissolves, and which again separates on cooling in white amorphous flakes. The melted insoluble acid was found on analysis to possess the same quantitative composition as the crystallized. The explanation of this isomerism will appear subsequently.

The analysis of opianic acid, and of its salts of silver and lead afforded for the crystallized acid the formula $C^{20} H^8 O^9 + HO$; in the salts the water is replaced by 1 atom of base. The atomic weight of the anhydrous acid is 2502.23.

Opianic acid forms with barytes, oxide of lead and oxide of silver, readily-soluble salts, which crystallize well, and part with water of crystallization by exposure of heat.

2. *Opianic Ether*.—This body could not be obtained by acting with muriatic acid gas on a solution of opianic acid in alcohol, but it is readily obtained by employing sulphurous instead of muriatic acid. It crystallizes on evaporation of the concentrated solution in minute colorless prisms, united into bundles and spheres. It possesses no odor and scarcely any taste; it is insoluble in cold water; when heated with it, it melts at about 212° to a clear heavy liquid, which on cooling solidifies to a white radiately-crystalline mass, with considerable contraction; it sublimes. Boiled for some length of time in water, it gradually dissolves, being converted into alcohol and opianic acid; this is very rapidly effected by caustic potash. The analysis confirmed its being of the oxide of ethyle $= C^4 H^5 O + C^{20} H^8 G^9$.

3. *Opiammon*.—This is a product of the metamorphosis of the opianate of ammonia; it forms on the evaporation of

a solution of this salt. The conversion is completely effected on heating the dried saline mass cautiously and equally to somewhat above 212° as long as ammonia is given off. At last it is converted into a pale lemon-yellow powder, which is opiammon. In its perfectly pure state it is probably colorless; it appears crystalline under the microscope. It is entirely insoluble in water, but when heated with water, to 302° , it forms a clear solution, and on cooling opianic acid crystallizes from a solution of opianate of ammonia. Opiammon melts readily and creeps up the sides of the vessel, but is not volatile. It is not altered by dilute hot acids.

From the results of analysis its composition may be expressed by the empirical formula $C^{40} H^{17} N O^{16}$. It originates therefore by the separation of 4 atoms of water and 1 equiv. of ammonia from 2 atoms of opianate of ammonia.

4. *Xanthopenic Acid*.—This is a nitrogenous acid, which is formed by the action of alkalies on opiammon; it is characterized by the yellow color of its salts. A solution of caustic potash does not at first act upon the opiammon, but it soon begins to dissolve, with a uranium-yellow color and with contemporaneous disengagement of ammonia. On boiling till this has ceased, a yellow solution is obtained of xanthopenate and opianate of potash. The xanthopenic acid is precipitated by muriatic acid in yellow flakes, and can be filtered before the opianic acid has time to crystallize from the hot liquid. In this reaction three-fourths of the nitrogen of the opiammon are expelled. Xanthopenic acid is a lemon-yellow crystalline powder; it melts and dissolves in alkalies with a uranium-yellow color. Heated with soda-lime it disengages ammonia. Its composition has not yet been ascertained.

5. *Opianosulphurous Acid*.—This compound is formed by the action of sulphurous acid on opianic acid; the latter is dissolved in large quantities by the hot aqueous solution of sulphurous acid, without separating or cooling. The so-

lution has a very peculiar bitter taste, and leaves behind for a long time a peculiar sweetish after-taste. Carbonate of lead and barytes dissolve in the liquid, and form beautiful crystalline salts, characterized by their lustre. It reduces selenium from selenious acid, and gold from perchloride of gold.

When the solution of opianic acid in sulphurous acid is evaporated at a gentle heat, the new compound is left as a crystalline transparent mass. It is perfectly free from smell. When treated with water it becomes milk-white, and acquires a strong odor of sulphurous acid. The separated white substance is unaltered opianic acid: this decomposition however is only partial.

The analyses of the lead and barytes salts have shown that a composition of this body may be expressed by the formula $C^{20} H^6 O^7 2SO^2 + HO$. The atom of water represents the bases in the salts. The author will subsequently return to the consideration of its peculiar composition.

6. *Sulphopianic Acid*.—This is an organic compound with sulphur, which is generated by the action of sulphuretted hydrogen gas on opianic acid, dissolved in water at a temperature of 158° . A gradually increasing turbidness results, which appears like precipitated sulphur; the body however which separates, and into which the whole of the opianic acid is converted, is the new compound. The gas must be passed through several days before the action is complete. The sulphopianic acid separates as a yellowish powder. On heating the liquid to boiling, the precipitate melts to a pale yellow clear oil, which sinks to the bottom and solidifies on cooling.

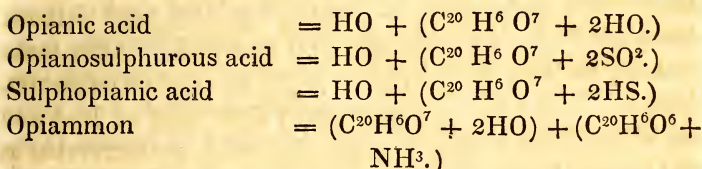
In this state the sulphopianic forms an amorphous, transparent, sulphur-yellow mass; below 212° it becomes soft, and at that temperature entirely liquid; heated more strongly, it is decomposed, giving off voluminous sulphur-yellow vapors, which condense into minute yellow acicular

crystals, which are readily soluble in alcohol. It burns with flame and with the odor of sulphurous acid. It is entirely soluble in alcohol, with a yellow color: if it had been melted, it is again obtained, even on spontaneous evaporation, in an amorphous state; but if the temperature had been so arranged at its formation that the precipitate could not become soft, it separates from the alcohol in minute yellow prisms; it undergoes therefore a similar metamorphosis at its melting point as the opianic acid. It is dissolved by alkalis with a yellow color, from which it is precipitated by acids in the form of a yellow emulsion, and without any disengagement of sulphuretted hydrogen. After some time however these solutions contain an alkaline sulphuret. In their unaltered state they afford with salts of lead and silver brownish-yellow precipitates, which are converted at a boiling heat into black sulphurets.

Sulphopianic acid is constituted according to the formula $C_{20}H^8O^7S^2$. It may therefore be regarded as hydrated opianic acid, in which 2 atoms of oxygen have been replaced by 2 atoms of sulphur; its formation is therefore quite simple.

The existence and composition of these bodies derived from opianic acid appear to afford some explanation respecting the true nature of this acid. The elements of 2 atoms of water are evidently removed from its composition by the influence of sulphurous acid and sulphuretted hydrogen, equivalent quantities of which take their place. To the author it appears most simple to admit, that besides the atom of water substitutable by bases, these 2 atoms of water are contained likewise as such in the opianic acid in a state of combination, in which they cannot be separated by bases, just as little as the organic body contained in benzoe-sulphuric acid separates from the sulphuric acid on its union with bases. The author regards opianic acid as a conjugated acid, the copula in which consists of 2 atoms of water,

which can be replaced by other copulæ, as sulphuretted hydrogen and sulphurous acid. Opiammon must then be considered as belonging to this series; it is a conjugated combination of 2 atoms of opianic acid, $2 \times (C^{20}H^6O^7)$, with 1 equiv. ammonia and 2 equiv. water, *i. e.* a combination of 1 atom of opianic acid with water for copula, and 1 atom of opianic acid with ammonia for copula. This view will be rendered intelligible by the following formulæ. The excluded atom of water is that which is replaceable by bases:—



The latter might also be regarded as biopianate of ammonia $= (NH^4O + C^{20}H^6O^7) + (HO + C^{20}H^6O^7)$. But it certainly is not a salt.

If this latter view is correct, it becomes highly probable that narcotine itself likewise belongs to this series, and is a body of analogous composition to opiammon, in which opianic acid may be admitted as pre-existing in the above sense.

The melted and insoluble opianic acid is probably a totally different body, but isomeric with the crystallized opianic acid, and has probably originated from the opianic acid having assimilated the elements of the 2 atoms of water under the influence of heat. If it consists of two bodies, as the microscopic examination tends to show, these together possess, as the analysis indicates, the composition of the crystallized opianic acid.

(To be continued,)

ART. XXXIV.—PREPARATION OF THE PERCHLORIDE OF IRON.

BY M. GOBLEY.

SESQUICHLORIDE or perchloride of iron exists in the anhydrous state and in the state of hydrate.

To obtain the anhydrous perchloride there are two processes. The first consists in placing in a luted glass or porcelain tube iron hammerings, and inserting the tube in a furnace; the tube should project some distance beyond the furnace. When the apparatus is thus arranged, that portion of the tube where the iron is placed is heated to a temperature below red heat, about 752° , and a current of dry chlorine is then passed through by one of its extremities. The gas is rapidly absorbed the iron becomes incandescent, and gives off abundant vapors of sesquichloride, which condense in the cold portion of the tube projecting beyond the furnace, in the form of laminæ of dark violet color, and possessed of a metallic lustre.

The second process consists in saturating commercial muriatic acid with dry or moist hydrate of the peroxide of iron. The solution is first effected at the ordinary temperature, then assisted by a gentle heat; and when the acid no longer takes up any oxide, the liquid is filtered, evaporated to dryness in a porcelain capsule, taking care to moderate the heat and to stir constantly. The product of this operation is transferred into an earthen retort, and heat gradually applied, taking care not to place any fire near the dome of the retort. Aqueous vapors are first disengaged; when they have ceased a cork is adapted loosely to the aperture of the retort, and the fire is then raised, so that the bottom of the retort is nearly red-hot towards the close of the operation. The anhydrous perchloride sublimes on to the

dome, and into the neck of the retort; when this has cooled sufficiently, it is broken, the chloride removed and transferred immediately into the bottles destined to receive it.

Although the last of the two processes described is the best and most easy of execution, there are many pharmacutists who are prevented from following it, and the medicinal perchloride of iron of the Codex is that which is obtained by the moist way. Several processes have been proposed for the preparation of the hydrated perchloride of iron. The Codex prescribes dissolving red oxide of iron in hydrochloric acid and evaporating the solution to dryness over the water-bath. This process is bad, for the product always contains, however carefully the evaporation may have been made, a large proportion of insoluble oxychloride.

Thénard, Berzelius and Orfila advise, in their works, dissolving sesquioxide of iron in hydrochloric acid, evaporating the solution to a syrupy consistence, and allowing to cool. The perchloride is deposited in the form of beautiful red crystals, which deliquesce with the greatest facility.

M. Béral proposed preparing it by dissolving precipitated sesquioxide of iron in hydrochloric acid, first cold and then over a water-bath; the solution is transferred into a porcelain capsule, and evaporated at a gentle heat to a syrupy consistence; when arrived at this point, the capsule containing the perchloride of iron is placed by the side of another containing caustic potash or lime, and the whole covered with a bell-glass. The alkali absorbs both the water and the hydrochloric acid, so that in ten to fifteen days the chloride forms a dry, confusedly-crystallized mass which is then transferred into a bottle under the bell-glass, to prevent the salts deliquescing in the air. This process succeeds very well, but it requires much time, and gives a chloride which is not of constant composition, because it retains variable quantities of water, owing to the method of its preparation.

M. Morh has recently proposed for preparing perchlori-

of iron, dissolving hæmatite by digestion in commercial hydrochloric acid, and boiling towards the end of the operation. The liquid is allowed to clarify, is then evaporated to the consistence of a liquid syrup, and placed well covered, in a cold situation, for instance in a cellar, where it begins to crystallize after some days, and continues to do so for some weeks; the mother-water is decanted and the crystals preserved. M. Mohr analysed the crystals prepared in this manner, and found them to contain 12 atoms of water; he has consequently assigned to it the formula $\text{Fe}^2\text{Cl}^3 + 12\text{HO}$.

M. Fritzsche, who undertook a fresh investigation in order to determine the proportion of water contained in the chloride of M. Mohr, found that this chloride gave very different results on analysis with respect to the quantity of water, which is equally the case with those obtained by the process described by Orfila, Thénard and Berzelius, and that it was impossible to decide whether it contained 10, 11 or 12 atoms of water; with 10 atoms it should contain 35.92 per cent., with 11, 38.15, and with 12, 40.22. According to the same chemist, on leaving the preceding chloride under a bell-glass with sulphuric acid, the crystals are again converted into a thick liquid, which gives rise to other crystals, containing from 21 to 23 per cent. water; 5 atoms would require 21.9 per cent. According to M. Fritzsche, the same crystals are obtained by fusing the chloride with 10, 11 or 12 atoms of water and evaporating until a drop solidifies on cooling, and then adding a few drops of concentrated hydrochloric acid before placing it aside to cool.

M. Fritzsche has been led by his experiments to admit the existence of two hydrates of the perchloride of iron perfectly crystalline, between which there is no other crystalline combination.

It will be seen from the above that the processes which have been described for the preparation of the hydrated

perchloride of iron are very numerous ; but it may be said that neither admits of the perchloride being obtained of a constant composition, in a short time, entirely soluble and capable of long preservation. The principal cause of the easy alteration of the chloride of iron prepared by the processes described, appears to be the large quantity of water which the preparation retains ; for instance, that of M. Béral, which contains least, affords, shortly after its preparation, a perceptible deposit of oxychloride when dissolved in water.

Induced by M. Soubeiran to find out a practical process which would allow of obtaining in a short time a perchloride of iron completely soluble, and of a constant composition, I believe I have succeeded by submitting the solution of sesquioxide of iron in hydrochloric acid to the two following conditions of evaporation :—1st, evaporation at a temperature not exceeding 212° , and 2nd, evaporation in perfectly dry air.

After several experiments I stopped at the following process :—Pulverized hæmatite is introduced into a stoppered flask, and a quantity of pure concentrated hydrochloric acid poured over it ; there should be an excess of hæmatite ; it is then agitated. The two bodies soon react on each other, forming water and perchloride of iron, with disengagement of heat ; when the first action is passed over, the flask is placed near the fire and shaken frequently ; after several hours contact it is allowed to subside, and is filtered. The filtered liquid is received in a porcelain capsule, which is placed either on some sand heated by steam or on the head of an alembic, taking care to interpose a piece of flannel between the alembic and the capsule, and to maintain this in its position by means of a piece of string. The apparatus should be so arranged that the steam is conveyed by a long tube into a vessel full of cold water ; for it is essential to the success of the operation that no aqueous vapor should circulate around the capsule ; since, when the

liquid is evaporated in the atmosphere charged with humidity, it is decomposed when the salt has reached a certain degree of concentration, hydrochloric acid is disengaged, and sesquioxide of iron precipitated. It must be stirred with a glass spatula during the whole time of evaporation, which is continued until the liquid no longer disengages any perceptible vapors of hydrochloric acid, and a drop solidifies on cooling. When it has reached this point, the chloride is poured into perfectly dry phials, provided with good corks; but from this chloride becoming very hard, it is difficult to remove it from the phials. To obviate this inconvenience, M. Soubeiran, who had the kindness to repeat the process, advises its being poured on to a slightly-greased plate, which is immediately covered by another plate, and joined to the first by means of a little luting. After four-and-twenty hours the plates are separated, the chloride broken into pieces, and immediately transferred into well-dried bottles, which should be corked with great care.

The perchloride of iron, prepared in this manner, possesses a dark yellowish-red color, no odor, but a very styptic taste. It is excessively and entirely soluble in water; the solution, which is of a beautiful golden yellow, preserves for an indefinite length of time, exposed to the air, without becoming turbid; it is likewise very soluble in alcohol and ether. Exposed to the air, it rapidly absorbs moisture, which at first it solidifies, but subsequently it deliquesces, and it is therefore necessary to keep it in dry and well-closed bottles. This chloride has the great advantage of keeping for a long time without being decomposed, owing without doubt to the small quantity of water it contains; thus the samples which I possess are as good at present as they were eight months ago, immediately after their preparation.

To ascertain the quantity of water which it contains, I took four samples of the chloride, one of which had been prepared by M. Soubeiran and the other three by myself, 1

gram. of each was decomposed by a gentle heat, and the decomposition assisted by adding several times a few drops of nitric acid. That prepared by M. Soubéiran left 0.393, and the three others 0.392, 0.385, 0.380. The mean of these four quantities is 38.75 which represent 26.86 per cent. iron, which require 52.58 chlorine to form sesquichloride. 100 parts of the chloride consist therefore of—

Iron	-	-	-	-	-	26.86
Chloride	-	-	-	-	-	52.58
Water	-	-	-	-	-	20.56
						<hr/>
						100.00

This chloride contains about one-fifth of its weight of water, or somewhat less than 5 atoms which require 21.9 per cent. It corresponds to the hydrate with 5 atoms of water of M. Fritzsche.

The process which I propose has therefore the great advantage of affording an entirely soluble chloride of a constant composition, and susceptible of long preservation, which hitherto had not been attained.—*London Chem. Gaz. from Journ. de Pharm.*

ART. XXXV.—ON THE HADSHY OF THE TURKS.

BY M. LANDERER.

THIS beverage is derived from *Cannabis sativa*. The relations of climate however produce a far more considerable developement of the narcotic principle.

The mode of preparing the hadshy is as follows :—When the hemp plants have blossomed, and have begun to form fruit, the delicate shoots, leaves and unripe fruit are pressed,

and set into vinous fermentation by means of a syrup from sweet fruits, or rather are thrown into the fermenting liquid. The fermented liquid is poured into flasks, and frequently colored red with *Coccus Cacti* or *Coccus Ilicis*, and then used as a spirit.

Another kind of hadshy occurs in the form of an electuary, which has very quick but transitory action on the human frame.

It is prepared in the following manner :—Dates, figs, currants and other sweet fruits are pressed to a paste, mixed with fresh hemp and poppy-leaves, and formed into balls, which are moistened from time to time with spirits, and preserved in a cool place until they diffuse a strong narcotic odor, which already produces intoxicating effects. This mass is now boiled with butter and oil of sesamum, and the products strained from the residue, poured into tin forms, and placed aside to cool. This is the hadshy of the Arabs, such as is sold in the bazaars of Cairo. It has a greenish-yellow color, a very rancid taste, and is void of smell.

M. Landerer digested a portion of this hadshy with dilute muriatic acid, and another portion with absolute alcohol. The liquids obtained were yellowish-green, and possessed a very bitter taste. The acid liquid gave voluminous precipitates with alkalies and likewise with tannic acid, which were of a very bitter taste. A concentrated solution of this substance rubbed on the eyelid of a cat, produces in a few minutes a very perceptible dilatation of the pupil ; it has likewise the same effect on the human eye. When the hadshy is mixed with water and submitted to distillation, the product obtained has a somewhat bitter taste and a faint odor of herbs. It may be drunk without producing any ill consequences.—*London Chem. Gaz. from Buch. Rep.*

XXXVI.—ON THE CRAJURU OR CARAJURU AND CHICA, A NEW RED TINCTORIAL SUBSTANCE FROM SOUTH AMERICA.

By J. J. VIREY.

THE leaves of various plants contain, besides the ordinary elements of vegetable organization, peculiar coloring principles; thus, for instance, blue leaves are frequently filled with indigo, as is observed in *Polygonum*, *Isatis*, *Nerium*, *Pergularia*, *Hedysarum*, *Galega*, &c., for even the cows which feed upon them sometimes give blue milk.

Other leaves naturally become red, owing to certain properties peculiar to their juices, but especially to the action of heat and light. These kinds of vegetables, generally astringent or acid, are more frequent in southern countries, where they develop their red tints to a greater extent at an advanced period of vegetation, as in autumn; this is the time for obtaining peculiar red dyes. We might enumerate a long list from among the *Rubiaceæ*, *Rosaceæ*, *Leguminaceæ*, &c., even of our temperate climate, but the richest tinctorial products are peculiar to intertropical regions.

M. de Humboldt has described in the 'Annales de Chimie et Physique,' (vol. xxvii. p. 315,) under the name of *Chica*, a vegetable product of a brick-red color, obtained by macerating in water the leaves of *Bignonia chica*, a shrub of the family of the *Bignoniaceæ* from equinoctial America.

As we have obtained from Para in Brazil, under the denomination *Crajuru* or *Carajuru*, a substance not only analogous in its physical and chemical characters to the *Chica*, but of a red brown violet tint, much more beautiful or rich, and like vermilion, whilst the other appeared duller and much inferior, it may be useful to give fresh de-

tails about this product, which has been imported to be tried in dyeing.

The *Crajuru* or *Carajuru* (*Carucuru* according to others) is a kind of powder or fecula, in pieces somewhat light, inodorous, insipid or slightly bitter, not soluble in water, but soluble in alcohol, ether and the oils and fats, without being completely resinous, burning with a flame, but leaving a quantity of gray cinders. It is wholly dissolved by alkalies, and acids precipitate it without greatly altering its color, if they are not concentrated.

The *Chica* of M. de Humboldt came from the neighborhood of the Orenoko, near Rio Meta; but the *Crajuru* seems to be the kind mentioned by Hancock, from Guiana, as being purer, and sent in the form of balls, enveloped in the bark of trees or palm-leaves. Indeed, the *Crajuru* is of an intense violet tint, with a coppery lustre when rubbed on a hard body. MM. Boussingault and Rivero also state that it is advantageously used in dyeing.

It would therefore appear that it is not only the *Bignonia chica*, but perhaps other kinds of shrubs of the same genus, which afford the finest *Carajuru*. The Galibis, and other savage tribes, boil the stalks and leaves of these *Bignoniæ*, which are of a red tint at their advanced period of vegetation, to obtain it. It is passed through a sieve made of the bark of a tree, and the fecula is well washed in water, and then exposed to the sun to dry.

The natives only use the *Chica* or the *Crajuru* for painting the skin, either as a defence against humidity and the bites of insects, or as a brilliant ornament, and in order to render themselves formidable in their wars. For this purpose they pound the *Chica* or *Crajuru* with a fat liquid, as the bitter and yellow oil of the fruit of the carapa, (*Xylocarpus carapa*), made fragrant with the balm aracouchini (*Amyris heterophylla*, Wild.) Other travellers assert that the aborigines prefer the fat of tortoises, which is green, or still better, the musky fat of the *Crocodylus acutus*, for

making a kind of *Chica* pomatum, and anoint their skin with it.

The *Crajuru* now brought into Europe must furnish a rather strong and beautiful dye, the brilliancy of which appears quite superior to that of Orleans.*

Lond. Chem. Gaz.

ART. XXXVII.—ON TWO KINDS OF VEGETABLE WAX,
FROM BRAZIL.

By M. SIGAUD.

THE first kind of wax known under the name of *Car-nauba*, is afforded by a palm which grows in abundance in the northern provinces of Brazil, especially in the province of Ceara. It forms a thin layer on the surface of the leaves of the tree. The cut leaves are dried in the shade; scales of a pale yellow very soon separate, which melt when heated, and give a mass of true wax, the sole fault of which is that it is rather brittle.

The first samples of this wax were sent by the governor of Rio Grande to the Count de Galveas, who in his turn sent them to Lord Grenville. Mr. Brande published an analysis in the Phil. Trans. for 1811. Mr. Brande endeavored to discover a method of bleaching this wax, but without success. He was more fortunate in some experiments of manufacturing it into candles; his experiments

* The drink called *chica*, which is so much used among the people of South America, must not be confounded with the subject of the present notice. This drink, in fact, is prepared with pods of algaroba, (*Mimosa algaroba*), which are nearly as sweet as the carouba of the *Ceratonia siliqua*, and with the bitter stalks of the *Schinus molle*. It is said that old women are employed to chew these *Algarobæ* and the *Schinus*, and then to spit them into a vessel; water is added; the whole soon ferments, and affords a kind of intoxicating beer.

were repeated at Rio Janeiro with a very satisfactory result, so that at present the substance has become an object of commerce. It meets with a ready sale in the market of Rio Janeiro, and vessels go even as far as Ceara in order to obtain cargoes of it.

The second kind of wax, known in the country by the name of Ocuba wax, is derived from a widely-distributed shrub in the province of Para, and also appears to be found in French Guiana. This shrub, which is rather bushy, scarcely attains the height of thirty hands; it grows in the marshy lands, and abounds on the shores of the Amazon river and its tributaries. It affords a fruit of the form and of the size of a bullet, containing a nut covered by a thick crimson pellicle, which imparts a red tint to water, and affords an excellent purple color. After its first washing the nut retains its black color; it is piled in heaps, ground and reduced to a pulp; it is then boiled for a certain time, in which operation it affords a wax, which floats on the surface of the vessel. This crude wax greatly resembles bees' wax; it has also much analogy with the wax Ibucuiba, which M. de Humboldt described on his return from America, and of which I have preserved a sample for the sake of comparison. Submitted to a process of purification, the Ocuba wax acquires a brilliant white, and is used for candles; it affords a light similar to that of gas. At Belem, the capital of Para, this wax has long been used for the manufacture of cheap candles. 16 kilogrms. of seed afford 3 kilogrms. of wax. These trees are so numerous in Para, along the banks of the Amazon river, that in the months of January, February and March the entire population is occupied in gathering the seed or fruit, as they are occupied in Europe during the months of September and October in getting in the vintage.

Ibid, from Journ. de Pharm.

At a Public Commencement of the PHILADELPHIA COLLEGE OF PHARMACY, held Thursday evening, April 25th, the degree of "*Graduate in Pharmacy*" was conferred upon the following gentlemen, pupils of the Institution :

Subject of Thesis.

Daniel S. Jones,	Arum triphyllum.
Jacob S. Smith,	Aralia nudicaulis.
Joshua S. Jones,	Cimicifuga racemosa.
Caverly Boyer,	Asclepias tuberosa.
Andrew McKim,	Cypripedium pubescens.
Edward Donelly,	Phytolacca decandra.
Silas Hough Wentz,	Erigeron philadelphicum.
Alfred B. Taylor,	The Air Pump.
Thomas S. Wiegand,	Aristolochia reticulata.
Thomas Estlack, Jr.,	Spigelia marilandica.
Robert Coulton Davis,	Cantharis vesicatoria.
George H. Mitchell,	Podophyllum peltatum.
Robert C. Brodie,	Copaiba.

After which an Address was delivered by PROFESSOR BRIDGES.

MISCELLANY.

Employment of Electricity in cases of poisoning with Strychnine.—M. Duclos has instituted a remarkable series of experiments on rabbits, dogs and guinea-pigs. He poisoned these animals with strychnine and brucine, and then electrified them; and found that, on application of the negative electricity excited by means of an electrical machine, the symptoms of poisoning subsided, and the animals were saved; the positive electricity, on the contrary, increased the muscular contraction produced by the posion, and hastened death.

Animals which had been poisoned with arsenious acid could not only not be saved by electrifying them, but were, on the contrary, killed sooner, whether positive or negative electricity was employed.—*Chem. Gaz. from Buchner's Rep. für die Pharm.*

Efficacy of Tannic Acid in Poisoning by Hemlock.—Hitherto tannic acid, or the decoction of galls, or of any astringent vegetable, has been considered of great service in cases of poisoning by strychnine and brucine. M. Meyer had recently occasion to observe the great efficacy of tannic acid also in a case of poisoning by hemlock. Four children had eaten a large root of the water hemlock, *Cicuta virosa*, L. One child died almost immediately; to the other three sulphate of zinc was first administered in large doses to produce vomiting, which was assisted by draughts and frictions to the stomach, after which cold applications to the head, horse-radish and mustard plasters were used, clysters of vinegar administered, the cold extremities rubbed with flannel and warmed, upon which a decoction of gall was administered in frequent doses and with the greatest success, for the alarming symptoms gradually disappeared, and the three children were perfectly restored after five days.—*Ibid.*

Extract of Hops and Oil of Hops for the Preparation of Beer.—Prof. Redtenbacher draws attention to the fact, that of the constituents of the hop, the bitter substance (lupuline), the astringent substance, and the aromatic oil of hop, are the only substances which enter into the composition of beer. The aqueous extract of hop, prepared by boiling, may easily be preserved, and 12 lbs. of it correspond to 1 cwt. of hops; it contains the first two constituents. The oil of hops, which in the

usual method of employing the hop is volatilized for the greater part, may be obtained by distillation with water; 1 cwt. of hops would afford 3 oz. If, then, in brewing, extract were to be employed instead of hops, and the oil added when the beer is filled into the fermenting vats, the brewer would save all the expense of store-room for hops, avoid all the risks of the hop trade, could not easily be cheated, would be able to determine with greater certainty the quantities necessary to be added, and would require less hops, from the saving effected in the quantity of oil. The expense of obtaining the extract and oil from 1 cwt. of hops would not amount to any great deal, and by this a fourth of the hops would be saved on account of the oil; so that when the price of hops stood at 120 florins per cwt. there would be a clear saving of 25 florins on the hops alone. A butt of beer would require about 2 oz. of extract and 11 grs. of oil.—*Polytech. Central Blatt.*

[Another advantage of this extract, should it be found to answer, would be that the English brewer might import extract from America, from which country it is impossible to import hops, owing to their bulk.—*Chem. Gaz.*]

Preparation of the Red Iodide of Mercury (Iodine Red) as a Paint.—

M. Heller recommends the following method for obtaining a good iodine red. Commercial crystallized iodide of mercury is pounded and dissolved in a boiling solution of sal-ammoniac (1 part of sal-ammoniac to $1\frac{1}{2}$ water). The iodide of mercury is conveyed into the boiling solution as long as any dissolves; the hot solution is then decanted and allowed to cool, upon which the iodide of mercury again separates. It is deposited in very beautiful purple-red crystals on the sides of the glass. Frequently these crystals appear at first of a pale yellow, owing to the dimorphism of this salt; but soon after the cooling of the liquid they become as beautifully red as those which directly separate of this colour. If the solution of sal-ammoniac was too concentrated, the sal-ammoniac is frequently deposited in white crystals along with the red ones; this does no harm, as they may easily be separated by washing with water, to which they dissolve, while the latter are insoluble. When the cold liquid has been allowed to stand for half a day, the separation of crystals has terminated; the liquid is then poured off, the crystals are washed, separated by means of a glass rod from the sides of the vessel, and dried. They are not pulverized, but are preserved whole, and whenever wanted for use a small quantity is ground up with gum or oil. The colour of the crystals is not so yellowish-red as the commercial powder, the well-known iodine-red, but more of a purple-violet. The bright red colour is acquired when the crystals are re-

duced to powder; it is the brighter, *i. e.* has a less violet tint, the finer it is pulverized.—*Chem. Gaz. from Polytech. Central Blatt.*

Adulteration of the Neutral Chromate of Potash.—According to the observation of C. Erdmann of Leipsic, there occurs at present in commerce a chromate of potash of English manufacture, which is nothing less than chromate of soda, sophisticated moreover with sulphate of soda. Now, chromate of soda, when crystallized at a temperature below 86°, contains 53 per cent. water, while the potash salt is entirely free from water under all circumstances. The spurious chromate of potash in question has given rise to numerous complaints respecting its want of efficacy, and has proved indeed to contain a considerable amount of water. The adulteration is evidently not unintentional, and is based on the chromate of soda crystallizing with this amount of water at a low temperature, and then possessing the form of sulphate of soda. The chromate of soda is obtained at a higher temperature as free from water as the potash salt: and if the soda salt were pure, there would then be a gain in the amount of chromic acid with this substitution, from the equivalent of soda being lower.—*Ibid from Pharm. Central Blatt.*

New Salt of Mercury and Quinia.—The combination of oxymuriate of mercury and tincture of bark has been long known as a remedy for the treatment of scrofula and enlarged mesenteric glands, also in the treatment of strumous ophthalmia. This combination is well known to be unchemical, the salt being decomposed by the bark. Mr. R. N. M'Dermott of Dublin, convinced of the value of a combination of the active principle of the barks with salt of mercury—"a combination which, according to the concurring testimony of various physicians, accelerates, in a remarkable manner, the constitutional action of mercurials, was brought to think that a definite compound might be formed in which the bichloride would perform the part of an acid, and the alkaloid quinia form the base, and which would combine the therapeutic value of these two important substances." On trial he found the results were exactly as he had anticipated. He obtained a double salt, a proto-chloride of mercury and quinia, chemically combined. On subjecting it to the strictest analysis, no trace of bichloride could be detected. The intimate combination of the active principle of the bark with mercury in the form just indicated, will, in his opinion, render it less liable to produce the ill effects of mercury on some constitutions, while its efficacy as a general remedy must be much enhanced. He anticipates that the combination of these two agents will rarely fail of producing a happy result in the diseases of the eye generally, but especially when scrofula is present. *Dublin Medicul Press.*

Valerianate of Zinc.—This new preparation is extolled by some of the Italian physicians as a very powerful remedy in several nervous affections. It is formed by adding the protoxide of the metal to the vegetable acid to saturation, and then slowly evaporating the solution. It is administered in the form of pill in the dose of one or two grains. In the *Bulletino delle Sc. Mediche* some cases of neuralgia successfully treated by it are recorded.

Chloride of Magnesium.—This has lately been recommended as a saline aperient by Dr. Lebert. It is said to produce no injurious effect whatever on the stomach, and if occasionally it gives rise to any unpleasant sensation, it inconveniences less than most other purgatives. It would also seem to favor digestion since its purgative action is followed by an improvement of the appetite. The mean dose as an aperient is 32 grammes for an adult, and half that quantity for a child of from ten to fourteen years of age.—*Prov. Med. and Surg. Journ., from Gaz. Méd. de Paris.*

Confectio Ferri Composita.—Mr. Heathcote, of Gosport, gives us a formula, which, he says, is in frequent use in Bath. The “Clinkers” may be readily got at any blacksmith’s forge.

Take of Clinker, freed from all impurities and reduced to an	
impalpable powder	- - - - 8 ounces
Carbonate of Magnesia	- - - - $\frac{1}{2}$ an ounce
Powdered Ginger	- - - - 1 drachm

Treacle a sufficient quantity to form the whole into an electuary.

Lond. Medico-Chirurgical Review.

Preparation of Benzoic Acid By PROF. WÖHLER.—Pulverized benzoïn resin is dissolved, with the assistance of heat, in about an equal volume of highly rectified alcohol, and the solution mixed while hot, but gradually, with so much fuming muriatic acid that the resin begins to be precipitated. The mass is then submitted to distillation. The benzoic acid passes over in the form of benzoic ether. The distillation is carried on as long as the consistence of the mass admits; when it becomes too thick, it is allowed to cool a little, hot water added to it, and again distilled as long as any ether passes over. The water remaining in the retort is, when clear, poured off boiling-hot from the resin; on cooling it deposits benzoic acid, probably derived from benzoic ether.

The product obtained is digested with caustic potash until the whole of the ether is decomposed, finally heated to boiling, and saturated with muriatic acid, when the benzoic acid separates in crystals on cooling.

It appears that the entire amount of benzoic acid of the resin is obtained in this manner; and it may be observed, with reference to the pharmaceutical application, that the acid so prepared possesses entirely the odor of the sublimed acid. Whether the stated proportions of resin, muriatic acid and alcohol are the most advantageous, I am not able at present to say.—*Liebig's Annalen, from Lond. Chem. Gaz.*

Cement for the Teeth. By OSTERMAIER.—According to Ostermaier, this cement is prepared by mixing 52 parts of chemically pure and finely-powdered caustic lime with 48 parts of pure anhydrous phosphoric acid, obtained by the combustion of phosphorous in dry air; the mixture is rapidly triturated in a mortar.

A sufficient quantity of the powder thus prepared is then introduced into the cavity of the carious tooth; it is strongly compressed, and the surplus is equalised as much as possible, then it is slightly moistened.

It must be observed that this powder can be used only in one or two minutes; consequently, it should be prepared only just before it is used.—*Lond. Chemist, from Jahrbuch für Praktische Pharmacie.*

On the Means of Preventing or Curing the Injuries Caused by a long Decubitis. By DR. TOTT, OF RIENITZ.—Besides the means already known and used for preventing ulcerations by decubitis, Dr. Tott makes use of the following mixture, the formula of which is due to the celebrated Mursinna:—

R. Tincture of camphor	} 250 parts.
Goulard's vegeto-mineral water	

Mix.

With this mixture the points of the skin which have been rendered red by continued pressure, are washed, and these washings are repeated several times during the 24 hours, taking care to shake the bottle well before pouring out the quantity of liquid necessary for each application.

If, notwithstanding the employment of this mixture, the symptoms remain, and the skin begins to ulcerate, Dr. Tott rubs the wounds with an ointment of lead and zinc, or, again, with the camphorated white rhazes: in the most serious cases he had recourse to tannate of lead, under the following form:—

R. Recent tannate of lead	-	-	-	12 parts.
Lard	-	-	-	30 "

Make a perfectly homogenous ointment.

He applies this mixture three or four times a day.

But the best means which the author prescribes, as well by way of prophylactic for phlogosed surfaces, as for cicatrising those which are already ulcerated, is the creosotic water prepared according to the pro-

portions indicated by Reichenbach (one part of creosote to 80 parts of distilled water.) He employs this water in all cases, except in those where the wound presents a blackish cindery tint, that is to say, where gangrene already exists. In the latter cases, he recommends fomentations with the decoction of yellow quinquina, to which a small quantity of tincture of myrrh has been added, and he sprinkles the wound with a powder composed of camphor and myrrh, or he also applies to the ulcerated surfaces fine cloths covered with a layer of camphorated storax ointment.—*Ibid from Walter und Ammon's Journal.*

Preservation of Pathological Specimens.—M. Pigne announces that a solution of creosote, in the proportion of 4, 5, 6, 8, or 10 drops, according to circumstances, to the litre, or pint and three quarters of water, forms an excellent, and of course very cheap liquor for the preservation of specimens. An entire subject, or any portion of it, kept in the solution of 10 drops, preserves all its physical characters and properties unchanged for an indefinite length of time. Pathological specimens, that have been shrunk and blanched by twenty years' keeping in spirits, are very speedily restored to their original form, size, color, and pliability, by being transferred to the creosote liquor. Portions of blood, pus, urine, &c., may be kept in it, without undergoing any change, and examined at leisure.—*Ibid from Gaz. Méd.*

New Formula for an Agglutinative Plaster. By M. PRESTAT.

Rx.	Gummed diachylon plaster	-	-	-	400 parts
	White pitch	-	-	-	50 "
	Fine Venice turpentine	-	-	-	38 "

Melt the whole at a gentle heat; after liquefaction, add the two following substances, previously reduced to a very fine powder:—

Gum ammoniac	-	-	-	-	} 12 parts.
Mastic resin	-	-	-	-	

Mix intimately, then spread in the usual manner on strips of linen.

During cold weather, it is convenient to increase the proportion of turpentine by ten parts, and to add to the mass—

Oil of sweet almonds	-	-	-	-	12 parts.
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This plaster, which M. Prestat has employed for ten years, joins to the advantage of being powerfully adhesive, that of never causing irritation of the skin.—*Ibid from Encyclographie Médicale.*

Formula for a Blistering Plaster. By M. HOUDBINE.—The blisters prepared by M. Fumouze Albespeyre being very easy of employment, especially for carrying into the country, I was obliged to make some in order to satisfy the demands made upon me. Being desirous of avoiding this species of monopoly, I have long prepared a blistering plaster,

whose action is very prompt and certain. I send you my formula, in order that you may insert it in the *Journal de Chimie Médicale*, if you think it useful to our brethren.

R. Purified Burgundy pitch	-	-	-	60 parts.
Purified resin of elemi	-	-	-	60 "
Oil of cantharides	-	-	-	60 "
Yellow wax	-	-	-	125 "
Cantharides, in fine powder	-	-	-	125 "
Sulphuric ether	-	-	-	125 "
Camphor, in fine powder	-	-	-	20 "

I place the finely powdered cantharides in a vessel; I add the ether, cork, and leave in contact for eight days. I then melt, over a gentle fire, the Burgundy pitch, the wax and the resin of elemi, with the oil; I add the cantharides, and keep the mixture in fusion for at least two hours, taking care to stir occasionally: finally, I mix the camphor in very fine powder. I employ for making my plaster cloth waxed on one side only, the plaster adhering to it better than when the surface on which it is spread is smooth. By following this formula, every pharmacist may be freed from the necessity of having recourse to another to procure a convenient plaster, and which may be made as easily as any other plaster.—*Ibid from Journ. de Chim. Méd.*

On Solanine. By DR. HERMANN BAUMANN.—M. Baumann undertook a series of long and interesting experiments on solanine, and the results which he has obtained, as well as those already published by other observers, have led him to the following conclusions:—

1. Solanine is found in the potato.
2. It exists in the stalks and leaves of the potato, as well as in that of most plants of the family *Solanacæe*.
3. It is met with in greater quantity in the germs, in smaller quantity in the stalks and leaves, and the tubercles contain the least of all.
4. By boiling potatoes in water, the solanine is at least partially eliminated.
5. Wakenroder's method appears to be the best for the extraction of solanine.
6. Solanine forms with the acid salts which are partly crystallisable, and partly amorphous; many of them have a great tendency to be converted, by the contact of water, into acid and basic salts: this effect especially takes place with the amorphous salts.
7. Solanine, as well in substance as in the solid state, acts, even in small doses, in a very energetic manner on the animal organism; but, if it is rejected by vomiting, it does not leave any bad consequences.
8. It should not be ranked among the alkaloids, which act in a lethal manner, although in certain circumstances it may be so.—*Ibid from Ibid.*

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OCTOBER, 1844.  
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ART. XXXVIII.—ON PRECIPITATED CARBONATE OF LIME.

BY ROBERT BRIDGES, M. D.

THE precipitated carbonate of lime, which is an officinal preparation of the Dublin Pharmacopœia, has of late found much favor with some physicians, as capable of producing a mixture superior to the prepared chalk, in being more free from grit. The preparation most esteemed is the imported article, an opinion having been expressed, that the preparation as generally manufactured here, is not superior in its state of division to the ordinary prepared chalk. As the article is modified very essentially as to its pulverulent state by the mode of its production, the following observations may not be irrelevant at the present time.

The circumstances modifying the minuteness of the divisions may be comprised under three heads—viz :

1. Density of the solutions used. 2. Nature of the compounds used to produce the double decomposition. 3. The temperature at which the precipitate takes place.

It may be premised that under all circumstances of precipitation, carbonate of lime has a strong tendency to assume a crystalline form and structure, as is very manifest in stalactital concretions, which are generally formed by the precipitation of carbonate of lime from its solution in water by means of carbonic acid. The same structure is also produced, on mixing a solution of lime with any soluble carbonate—although in some instances it may require a high magnifying power to detect the crystalline form.

1. Density of the solutions which are used in the precipitation, produces the least effect of the three circumstances noticed; but it may be stated, that very strong produce a finer precipitate than very weak solutions—probably in consequence of the density causing a more rapid formation of the carbonate—and hence, less time is afforded for the concretion of the particles in crystallizing.

2. The nature of the compounds used to effect precipitation produces more manifest effects. With respect to the lime compound, the variation is not very great. Acetate of lime, however, produces a precipitate more divided than chloride of calcium. With respect to the precipitant the choice is more important. Carbonate of potassa is totally unfit to procure a good pharmaceutical preparation. It produces a precipitate which is coarse and gritty, being constituted of crystalline grains of such magnitude, that the carbonate thus made presents the appearance of fine sand; when dry, the particles cohering very slightly either to each other, or the containing vessel, so as readily to roll over, on every change of position. The crystalline structure is here manifest through a magnifier of no great power.

Carbonate of soda and carbonate of ammonia, afford a better preparation; the precipitate being more divided, but still possessing some of the above noticed sabulous characters—not, however, so very manifest as in the preceding case. The size of the particles may still be detected by the tongue, which affords the most sensitive surface for the perception of grit.

3. The temperature at which the precipitate forms, is very material to the resulting fineness of the precipitated carbonate. The preceding remarks apply to common temperatures, the precipitate increasing in minuteness of division with the rise of temperature, and when boiling solutions are used, loses entirely the sandy character. The precipitate then formed is smooth, and perfectly without roughness, even when placed on the tongue, and the particles

now cohere when dry, both to each other and the containing vessel, as is usual with fine powders.

This difference is due to the dimorphous character of carbonate of lime, and the influence of temperature in bringing out and rendering this condition manifest. At low temperatures the ordinary form of crystal, viz., that of rhomb spar (the regular rhombohedron) is produced; but at high temperatures, the more rare configuration of arragonite, (six-sided prism,) is the result. The former occurring in nature, always of manifest size; the latter generally in minute crystals.

From the above remarks it must be evident, that the Dublin formula should afford a tolerably good pharmaceutical preparation, although it does not combine all the circumstances necessary for the best result. In this formula a strong solution of chloride of calcium (Ca Cl 2 parts, to aq. 7 parts,) is precipitated by a strong solution of carbonate of soda, (NaOCO_2 3 parts, to aq. 12 parts,) but no reference is made to temperature, hence ordinary temperatures are to be understood; and the result is, that although the particles of the powder are very small, yet some degree of grit may be detected by the tongue. The article imported into this city, may be presumed to be formed by this process, as it cannot be distinguished by any character from that prepared according to these directions. To produce the best preparation it is only necessary to modify this process by using boiling solutions, to produce a precipitate as minutely divided as may be desired, and in which no grit can be detected.

ART. XXXIX.—REPORT ON CATECHU.

THE Committee to whom was referred for examination a specimen of Catechu, after due investigation, offer the following Report :

The specimen in question was obtained from the extensive drug warehouse of the Messrs. Lennig of this city, where it is found in large quantities, having been imported by them under the name of *Terra Japonica*, from England, for the use of calico dyers in this country. It is very little known in our market, and is now for the first time brought under the notice of our apothecaries. It is brought from Singapore to Liverpool, where it goes under the name of *cutch*, in large masses weighing 150 lbs., covered over with palm leaves, and encircled by a kind of basket formed of strips of cane.

The breaking open of one of these bags presents to view masses of irregular cubical blocks, whose sides average an inch square, and adhering together from being packed when imperfectly dried. It is of a deep yellow or cinnamon color internally, mingled occasionally with spots of white—and reddish brown externally. This dark color is interspersed throughout the mass, upon the division line of the cubes.

It is inodorous, has a powerfully astringent, somewhat bitter, and a subsequent sweetish taste; is very friable, and presents a dull earthy surface when broken. Though presenting an amylaceous aspect, the presence of starch is not revealed by the usual test. Its lightness is such as to enable it to float upon water. Heated, it softens, swells up, and when consumed leaves but little ashes.

It is almost wholly soluble in cold water, 7-8ths of substance being taken up by displacement with this menstruum, furnishing by evaporation a translucent dark extract.

It completely dissolves in hot water, from which, upon cooling, no inconsiderable portion of *catechine* is deposited from the thin turbid liquor. 240 parts of this Catechu treated with rectified alcohol by displacement, yields upon evaporation, 220 parts of extract, of which 96 per cent is soluble in water. The marc after displacement with alcohol, dried and treated with water, furnished 10 parts extract. Sulphuric ether takes up 35 per cent. of soluble matter, forming with it a beautiful deep red tincture: the insoluble portion is black, tough and elastic.

From a comparison of the above descriptive analysis, with the article of *Gambir Catechu* mentioned in the U. S. Dispensatory, p. 194, as also Pereira's *Materia Medica*, vol. 2d, they will be perceived to be identical. Though supposed to be an inferior quality of an officinal Catechu, ranged under the head of *Catechu in quadrangular cakes*, a material difference will be perceived to exist in the character of the two varieties. Gambir, is preferred in the arts, not merely from its low price, but according to the representation of dyers, as being richer in the astringent principle. Experiments upon it prove the proportion of tannin to be large, consisting chiefly of this, with apotheme, or the peculiar extractive and catechine. From the difficulty of separating the compound of tannin and gelatine, a method given by Berzelius, to appreciate the quantity of tannin contained in Catechu, was resorted to. It is this:

“Dissolve out with water the soluble matter of catechu, filter and add sulphuric acid, which occasions a slight precipitate, which you separate by filtration: afterwards pour into the clear solution concentrated sulphuric acid, until it no longer precipitates. Gather the precipitate upon a strainer, wash with sulphuric acid diluted to about the degree of the filtered liquid, and place the strainer between bibulous paper to extract the moisture. Then dissolve in boiling water, and suffer the solution to cool. A compound of sulphuric acid and apotheme is deposited; filter and mix

the orange colored solution with finely powdered carbonate of lead in small quantities at a time, and as long as its addition occasions effervescence. Allow a slight excess of lead, sufficient to prevent chloride of barium forming a precipitate with the filtered solution. At this point filter and evaporate *in vacuo*. The resulting tannin will be in the form of a transparent, yellow, coherent mass, readily soluble in water,—but if evaporated in contact with the air, it will be of a deep red color, and not so completely soluble.”

This method enabled us to procure, allowing for some loss—about 40 per cent. of tannin. This, however, is believed to be an undervaluation.

As an article of medicinal worth, we believe Gambir Catechu, by reason of its great astringency, and the amount of soluble extract furnished by it, to be equal, if not superior to a number of the astringent extracts ranked as Official Catechu, and consequently deserving a place in the shop of the apothecary.

AUGUSTINE DUHAMEL,	}	Committee
JOHN H. ECKY,		
WM. PROCTOR, JR.		

June, 1814.

ART. XL.—ON THE PREPARATION OF PERCHLORIDE OF IRON.

THE sesquichloride or perchloride of iron exists in the anhydrous state and in the state of hydrate.

There are two processes for obtaining the anhydrous salt. The first consists in putting iron filings into a luted glass or porcelain tube, placed in a furnace, the tube being sufficiently long to project some distance beyond the furnace, and the iron being kept in that part of the tube directly exposed to the heat. When the apparatus has been thus arranged, the tube is heated to a temperature below that of red heat, about 752° Fahr., and then a current of dry chlorine is made to enter at one end of the tube. The chlorine is rapidly absorbed, the iron becoming incandescent, while copious vapors of sesquichloride are formed, which condense in the form of scales, having a violet color and metallic lustre in the cool part of the tube.

The second process consists in saturating commercial hydrochloric acid with hydrated peroxide of iron, either in the dry or moist state. The solution is commenced without heat; it is afterwards continued with the aid of a gentle heat: when the acid ceases to dissolve any more oxide, the liquor is filtered and evaporated to dryness in a porcelain capsule, taking care to moderate the heat and to stir constantly. The product of this operation is introduced into an earthen retort, and heated gradually, taking care not to apply any fire to the dome of the retort. Aqueous vapors are first disengaged; when these cease to appear, a cork is loosely fitted to the mouth of the retort, and the heat is then increased until the bottom of the retort becomes nearly red hot towards the close of the operation. The anhydrous perchloride sublimes on to the dome and into the neck of

the retort, which is to be broken when cold, and the salt immediately enclosed in bottles.

Although the second of these two processes is the better and more easy of execution, yet many pharmacutists would find a difficulty in preparing it; moreover, the Codex orders as the medicinal perchloride of iron that which is prepared by the moist way.

Several processes have been proposed for making the hydrated perchloride of iron, which I will describe.

The Codex orders the red oxide of iron to be dissolved in hydrochloric acid, and the solution evaporated to dryness in a water-bath. This process is a bad one; because, however carefully it may be evaporated, the product always contains a large proportion of insoluble oxychloride.

MM. Thénard, Berzelius, and Orfila recommend in their works to prepare it by dissolving sesquioxide of iron in hydrochloric acid, evaporating the solution to the consistence of syrup, and allowing it to cool. The perchloride is deposited in fine red crystals, which are very deliquescent.

M. Béral has proposed to prepare it by dissolving precipitated sesquioxide of iron in hydrochloric acid, first without heat, and then with the heat of a water-bath; the solution is transferred to a porcelain capsule, and evaporated at a gentle heat to the consistence of syrup. When it has arrived at this point, the capsule containing the perchloride of iron is placed by the side of another capsule, containing caustic potash or lime, and the whole covered by a bell-glass. The alkali absorbs the water and hydrochloric acid, so that in ten or fifteen days the chloride becomes a dry, imperfectly crystallized mass. To keep the salt dry, it should be at once put into a bottle, before it becomes affected by the external air. This method answers very well, but it has the disadvantages of requiring a good deal of time, and affording a chloride which is not always uniform in composition, as it contains variable proportions of water, owing to the method adopted in its preparation.

M. Mohr has recently proposed to prepare the perchloride of iron by dissolving hæmatite by digestion in commercial hydrochloric acid, and boiling the mixture towards the end of the operation. The liquor is allowed to become clear, is then evaporated to the consistence of a syrup, and afterwards exposed in a covered vessel, in a cold place, such as a cellar, where after a few days it begins to crystallize, and continues to do so for several weeks. The mother-water is decanted, and the crystals preserved.

M. Mohr analysed the chloride prepared in this way, and found it to contain twelve atoms of water. He has therefore assigned to it the formula $\text{Fe}_2 \text{Cl}_3 + 12 \text{H O}$.

M. Fristche, who undertook a fresh investigation to determine the proportion of water contained in Mohr's chloride, found that the analysis of this chloride (and the same is also true of those prepared according to the processes of Orfila, Thénard, and Berzelius) affords very variable results with reference to the proportion of water, so that it is impossible to say whether it contains 10, 11, or 12 atoms of water. With 10 atoms it should contain 35.92 per cent., with 11, 38.15, and with 12, 40.22.

According to the same chemist, if the preceding chloride be left under a bell-glass with sulphuric acid, the crystals are again reduced to the state of a thick liquid, from which fresh crystals are formed, containing from 21 to 23 per cent. of water. If they contained 5 atoms of water, there would be 21.9 per cent. These same crystals may also be obtained, according to M. Fristche, by fusing the chloride with 10, 11, or 12 atoms of water, evaporating so that a drop will solidify on cooling, and adding a few drops of concentrated hydrochloric acid before putting it to cool.

M. Fristche has been led by his researches to admit the existence of two hydrates of perchloride of iron perfectly crystallizable, between which there is no crystallizable combination.

As will be seen, many processes have been given for the

preparation of hydrated perchloride of iron, but none of these are adapted for obtaining it readily, of uniform composition, entirely soluble, and susceptible of long preservation. The principal cause of the easy alteration which the chloride of iron undergoes when prepared by either of the processes described above, seems to be the large quantity of water which it retains. Thus, that of M. Béral, which contains the least, affords, soon after its preparation, a perceptible deposit of oxychloride, when dissolved in water.

Induced by M. Soubeiran to seek a practical process for obtaining, in a short time, a perfectly soluble perchloride of iron, of a sufficiently uniform composition to admit of its strength being easily estimated, I believe I have succeeded, by submitting a solution of sesquioxide of iron in hydrochloric acid to evaporation under the two following conditions: first, evaporation at a temperature not exceeding 212° Fahr.; secondly, evaporation in perfectly dry air.

After several experiments, the following is the process at which I have stopped:—Take of hæmatite, that which mineralogists denominate concrete red oxide of iron, (*fer oxydé rouge concrétionné*,) reduced to powder by pounding and triturating in small quantities at a time in an iron mortar; introduce this into a stoppered bottle, and add to it pure concentrated hydrochloric acid in such quantity that there shall be an excess of hæmatite; then agitate the mixture. The two bodies soon react upon each other, producing water and perchloride of iron, accompanied with the disengagement of heat. This first action having subsided, place the bottle near the fire, and shake it from time to time. After remaining in contact for several hours, allow it to deposit, and then filter the solution. The filtered liquor is received in a porcelain capsule, which is placed either on sand heated by steam, or over the mouth of a cucurbit, taking care to interpose a piece of flannel between the capsule and the cucurbit, which should be tied on to keep it in its place. The apparatus should be so arranged that the

vapor may be all condensed by means of a proper refrigerator, as it is essential to the success of the process that no steam should circulate around the capsule, for if the liquor be evaporated in air charged with moisture, it undergoes decomposition at a certain point of concentration, hydrochloric acid being disengaged, and sesquioxide of iron precipitated. It should be stirred with a glass spatula during the whole time of evaporation, which must be continued until the liquid no longer disengages any sensible vapors of hydrochloric acid, and a drop solidifies on cooling. When it has arrived at this point, the chloride is poured into perfectly dry bottles furnished with good corks; but as the salt on cooling becomes very hard, it is difficult to get it out of the bottles, to obviate which inconvenience, M. Soubeiran, who repeated the process, very judiciously recommended to pour it into a plate which has been slightly greased, and immediately to cover it with another plate, and lute the two together. After about twenty-four hours, the plates are to be separated, the chloride broken, and immediately introduced into well-stoppered bottles.

The perchloride of iron thus prepared possesses a dark yellowish-red color, no smell, and a very styptic taste. It is very soluble in water; the solution, which is of a fine golden-yellow color, keeps for an indefinite time exposed to the air without becoming turbid. It is also very soluble in alcohol and in ether.

Exposed to the air, it rapidly absorbs moisture, which it at first solidifies, but it soon afterwards deliquesces, so that it is necessary to keep it in dry well-stoppered bottles.

This chloride possesses the great advantage of keeping a long time without undergoing decomposition, owing, no doubt, to the small quantity of water which it contains. Thus the specimen which I possess is now, eight months after its preparation, in the same state as when first prepared.

To determine the quantity of water which it contains, I

took four specimens of the chloride, one of which had been prepared by M. Soubeiran, and the other three by myself. One gramme of each was decomposed by a gentle heat, and the decomposition assisted by the addition, from time to time, of a few drops of nitric acid. The four specimens afforded products of sesquioxide of iron very nearly the same. That prepared by M. Soubeiran afforded 0.393, and the three others, 0.392, 0.385, and 0.380. The mean of these four quantities is 3.875, which represents 26.86 per cent. of iron. But 26.86 of iron requires 52.58 of chlorine to form sesquichloride, so that it follows that 100 parts of the chloride consist of

Iron, -	-	-	-	-	-	26.86
Chlorine, -	-	-	-	-	-	52.58
Water, -	-	-	-	-	-	20.56
						<hr/>
						100.00

This chloride contains about one-fifth of its weight of water, or rather less than five atoms, for five atoms would be in the proportion of 21.9 per cent. It corresponds with the hydrate, containing five atoms of water, of M. Frische.

The process that I propose has, then, the great advantage of affording a chloride entirely soluble, which has a composition sensibly uniform, and which may be kept for a long time, objects which have not hitherto been attained.

Pharmaceutical Journal, from Journal de Pharmacie.

ART. XLI.—ON THE CHLORIDE OF GOLD. By M. LEVAL.

MUCH difficulty has hitherto been experienced in obtaining the red and yellow salts of gold, so as to be perfectly soluble in water, and without reduction. After numerous experiments, I have succeeded in preparing these salts in a manner which appears to me to be unexceptionable.

M. Leval has published in the *Journal de Pharmacie* a good process for obtaining pure gold by means of protochloride of antimony; that which I have used in my experiments has been obtained by this method:—

First, To prepare the yellow salt of gold, *aqua regia*, formed of three parts of hydrochloric acid, one part of nitric acid, and one part of distilled water, should be used. Put one part of pure gold into a porcelain capsule, and pour over it *aqua regia*, prepared as above; the quantity of acid being double that of the gold employed. Cover the capsule with a plate of glass, and place it on a water-bath, made with a saturated solution of salt; continue the application of heat, taking care to keep the capsule always covered, until the evolution of nitrous vapors has ceased. If the whole of the gold is not dissolved, add a little more *aqua regia*, cover the capsule again as before, and continue the application of heat until the vapors no longer appear. The plate of glass should now be raised and kept up by a piece of folded blotting-paper, and evaporation continued over the water bath, until, on introducing a glass rod into the capsule, and withdrawing it, the chloride of gold, which adheres, on cooling becomes solid. Remove now the capsule from the water-bath, and the chloride will soon crystallize in small prismatic needles, of a fine yellow color, approaching to orange.

The chloride obtained in this manner is entirely soluble in water, and without reduction. It is employed with much

success in fixing the Daguerreotype images, and for many other purposes.

The red chloride of gold (terchloride) is prepared in the same manner; only the *aqua regia* employed is made with two parts of hydrochloric acid, and one part of nitric acid. The gold is first treated with excess of *aqua regia*, on a sand-bath, and the water-bath is not employed until the metal is entirely dissolved. In other respects the operation is conducted in the same way as in the preparation of the yellow chloride.

Ibid, from Ibid.

ART. XLII.—ON THE PREPARATION OF PHARMACEUTICAL EXTRACTS.

BY M. BURIN.

IN a work which I hope soon to publish, I have treated of the preparation of extracts in a series of articles, which, considered collectively, are founded on the following principles:—

1st. A vegetable substance being given, to endeavor to ascertain to which of its chemical constituents its medicinal activity should be ascribed.

2d. The active constituents being known, to study their chemical characters, in order to determine, among other things, the solvents which ought to be employed for separating these from such as are inert, and which on that account may prevent the preservation of the product, or destroy the energy of its properties.

3d. To effect the evaporation of the liquid employed as a vehicle, in such a way as to avoid completely the decom-

posing action which organic bodies so readily undergo in contact with chemical agents, such as heat, air, and water.

Based upon these principles, I will here give an explanation of the mode of operating which I adopt for the preparation of some extracts, selected from amongst those most frequently employed.

Belladonna, Stramonium, Hyoscyamus.

Most of the solanaceæ, and especially those named above, contain active principles, the chemical characters of which, and their action on the animal economy, are very similar.

In preparing the extracts of belladonna, stramonium, hyoscyamus, and some other solanaceæ, I take

The leaves and branches at the commencement of inflorescence,

Alcohol, sp. gr. 0.834, of each equal parts.

The plant is carefully crushed in a marble mortar, expressed with the hands, then again submitted to the action of the pestle. The juice obtained is added again to the plant, the alcohol is also added, and the whole allowed to macerate for six days. It is then thrown on to a strainer, and the marc submitted to the action of a powerful press. The liquors being put together and filtered, are distilled *in vacuo*, if possible, or otherwise over a water-bath, to recover the alcohol. In distilling over a water-bath, no alteration takes place in the product, as it is not exposed to the influence of the air. The residue is allowed to cool, and is afterwards filtered to separate the chlorophyle which is precipitated; it is now evaporated *in vacuo*, or if the necessary apparatus is not attainable, the product is put out, to the thickness of four-fifths of an inch, in large tin moulds, the surfaces of which have been rubbed with quicksilver, and left to spontaneous evaporation in a stove having a constant current of air heated from 95° to 104° Fahr. When the extract has acquired the consistence of honey, it is again

dissolved in three times its weight of spirit, sp. gr. 0.834. It is then filtered, distilled over a water-bath to recover two-thirds of the spirit, and the evaporation completed in the stove.

The product should be preserved in closely stoppered bottles.

The object of dissolving the hydro-alcoholic extract in concentrated spirit, is to separate a certain quantity of salts which are soluble in weak spirit, and also the inert coloring matter. This method, however, is not new ; it has, in fact, been already applied by M. Dublanc in the preparation of extract of lettuce, and by M. Lombard for extract of aconite ; finally, Messrs. Georges and Hespe have recommended its adoption in preparing the aqueous extracts of hyoscyamus and other solanaceæ from the dry plant.

The extracts of these three plants, prepared as above described, have a purpleish yellow color when viewed in thin layers ; they possess the peculiar odors of the plants, have at first an acrid taste, afterwards the mouth becomes dry and clammy, with a feeling of constriction at the back of the throat, which is accompanied with an effect on the brain similar to that caused by a small quantity of tobacco smoke to a person not accustomed to it.

They powerfully dilate the pupil of the eye.

One part of the extract represents the principle soluble in water and in alcohol, of

88 parts of fresh	Belladonna,	or	12 parts of	Powder.
110	"	Stramonium,	or 12	"
155	"	Hyoscyamus,	or 16	"

It is composed of yellow extractive, a complex body which retains a certain quantity of odorous volatile oil, and the whole of the crystallizable alkaline matter, or poisonous and medicinal principle of the plant, which is in a state of preservation that may be considered as perfectly normal, all chances of alteration that might have resulted,

either from the mode of operation or during the evaporation, being avoided almost entirely.

These extracts ought not to be employed excepting when specially directed by a medical man, and in no case should be substituted for those prepared in the ordinary way.

Extract of Gentian.

The observations of MM. Planche, Henry, and Caven-
toux, and of M. Leconte, have shown the presence of the
following substances in gentian: *volatile odorous principle,*
gentisine, gluey matter, green oily matter, uncrystalliz-
able sugar, gum, pectic acid, fawn-colored coloring mat-
ter, organic acid, and bitter extractive matter.

MM. Henry and Caven-
toux, extracted from gentian a
crystalline matter, which they considered, under the name
of *gentianine*, as the bitter principle of gentian; but this
substance, *gentisine*, as has been shown by MM. Leconte
and Trommsdorff, is nothing more than a pale yellow co-
loring matter, which crystallizes in long needles, tasteless
and inodorous, which is mixed in the *gentianine* with va-
riable proportions of the bitter principle and of fatty
matter.

It results from these facts, that the chemical nature of the
bitter substance of gentian has still to be determined; and,
as will be seen, in the state in which it is now obtained, it
exhibits the form of an uncrystallizable extractive matter,
very soluble in alcohol.

Gentian, in coarse powder,
Spirit, sp. gr. 0.834, aa, q. s.

The gentian is to be exhausted by Cadet's process, being
treated three times successively with twice its weight of
spirit. The liquors are put together and distilled over a
water-bath to recover the spirit. The extract obtained is
dissolved in distilled water, which takes up the bitter mat-
ter, the sugar, and the free acid, and leaves the fatty mat-

ter combined with the gentisine. It is filtered, and evaporation completed in the stove, and when the product has assumed the consistence of thick syrup, it is spread, by means of a brush, in thin layers over plates of tin, rubbed over first with quicksilver, and then with a cloth slightly moistened with oil of almonds. When the extract is dry, it is merely necessary to knock the back of the tin plate to detach it in beautiful yellow transparent laminæ, which should be preserved in well-stoppered bottles.

This extract, it will be observed, contains only the aromatic bitter matter of the gentian, the sugar, the free acid, and probably also a certain quantity of gentisine retained by the bitter principle. It represents the active principles of the gentian in a state of great concentration, and may form the basis of excellent preparations. One part of the extract is exactly equivalent to two parts of gentian root.

Extract of Digitalis.

As with gentian, three successive digestions with spirit, sp. gr. 0.834, entirely exhaust the digitalis of its bitter and odorous constituents. The liquors are mixed together; two or three litres of distilled water is added, or more, according to the quantity of matter under operation. The object of adding this water is to divide the chlorophyl, which otherwise carries down with it a considerable quantity of the active principles. It is then distilled over the water-bath to recover all the spirits, allowed to cool, and filtered to remove the chlorophyl. Proceeding afterwards in the same way as with the gentian, a dry extract is obtained in the form of fine transparent laminæ with very little color, but possessed in a high degree of the bitter taste and peculiar smell of digitalis. The smell becomes very perceptible on rubbing the extract, or moistening it with a little water. There can be no doubt that this extract is very energetic and preferable to all others; and that in the hands of an able practitioner it would form the basis of preparations possessing uniform medicinal activity.

One kilogramme (2.205 pounds) of digitalis, in powder, afforded me 108 grammes (1666.872 grains) of dry extract; but taking into consideration the inevitable losses in operating on larger quantities, it may be considered that one part of extract is equivalent to ten parts of the dry plant.

This extract should never be substituted for the ordinary extracts unless specially ordered.

Extract of Valerian.

According to Trommsdorff's analysis, valerian root contains,

Volatile oil,	}	soluble in alcohol.
Resin,		
Peculiar volatile acid, (valerianic acid,)		
Aqueous extractive,	}	soluble in water.
Peculiar substance,		
Starch,		

Experience has shown that the volatile oil, valerianic acid, and resin are essentially the active principles of valerian; on the other hand, the aqueous extract is not without action. It is desirable, therefore, to introduce into the product as large a proportion as possible of the three first substances, the solvent of which is concentrated alcohol, and also to admit a certain proportion of the constituents soluble in water.

The following is the mode of operating which I recommend:—

Valerian in coarse powder, Q. P. Carefully moisten this with twice its weight of spirit, sp. gr. 0.834. After being in contact for three days, introduce the mixture into an ordinary displacement apparatus, and displace the liquor by an equal weight of spirit, sp. gr. 0.915. The first product being distilled over the water-bath, the residue will be almost entirely composed of a dark green resin, holding in solution the whole of the volatile oil and valerianic acid. This product should be set aside in a well-stoppered bottle.

The spirit obtained by distillation is to be diluted with distilled water so as to reduce it to sp. gr. 0.915, and more spirit of this strength added, if necessary, to exhaust the valerian. All the liquors are to be mixed and filtered, and the spirit recovered from them by distillation. The residue is evaporated in the stove to a pillular consistence, when the first product is to be incorporated with it while hot. A perfectly homogeneous mass is thus obtained, which represents in a perfect state all the active parts of the valerian root.

One part of the extract is equivalent to five parts of valerian.

OBSERVATIONS ON THE PRECEDING PAPER.

BY M. SOUBEIRAN.

The object proposed in the preparation of extracts is to concentrate into a small mass the active parts of plants, without at all changing the state of combination in which they naturally exist. M. Burin proposes to extend the use of rectified spirit, which had been previously recommended, for concentrating the active parts and separating the inert parts of plants. This object appears to me to be attained in regard to the *Solanaceæ*. Is it equally with regard to the other plants selected by M. Burin? I will only allude here to two sets of experiments, one on valerian and the other on gentian, the experiments being made, in each case, on the same roots, so as to have comparative results.

Extract of Valerian.

One kilogramme of the substance.	Extract obtained.	Relation to the substance.	Water dissolves.	Spirit, sp. gr. 0.921 dissolves.	Spirit sp. gr. 0.834 dissolves.
Process of M. Burin. }	255 gr.	:1::4	80 per cent.	88 per cent.	96 per c.
Process of the Codex. }	205 gr.	:1::4.83	88 per cent.	94 per cent.	80 per c.

These two extracts were both very aromatic; that of the Codex being, however, rather less so than the other, and its color being darker.

I diluted them with water, and obtained the following results:—

M. Burin's Extract, diluted 800 to 1, specific odor destroyed.

————— 1000 to 1, specific taste destroyed.

————— 2000 to 1, bitterness destroyed.

Extract of the Codex, diluted 400 to 1, specific odor destroyed.

————— 800 to 1, specific taste destroyed.

————— 1000 to 1, bitterness destroyed.

The substitution of spirit, sp. gr. 0.834, for spirit, sp. gr. 0.921, does not, therefore, afford a very great advantage.

Extract of Gentian.

One kilogramme of the substance.	Extract obtained.	Proportion.	Water dissolves.	Spirit, sp. gr. 0.921 dissolves.	Spirit sp. gr. 0.834 dissolves.
Process of M. Burin. }	112 gr.	:1::8.9	The whole, except some flakes.	The whole.	96 per c.
Process of the Codex. }	364 gr.	:1::2.75	98 per cent.	85 per cent.	20 per c.

Extract of M. Burin, diluted 10,000 to 1, bitterness still very perceptible.

————— 20,000 to 1, bitterness distinct.

Extract of the Codex, diluted 4000 to 1, the color sensible, bitterness distinct.

————— 20,000 to 1, bitterness destroyed.

The extract made with spirit, sp. gr. 0.834, contains the

bitter principle in a state of greater concentration; but what is the price at which this advantage is obtained? there is only one-third of the quantity of extract. Spirit, sp. gr. 0.834, is not a very good vehicle for extracting the bitter principle from gentian root; when it has ceased to act, spirit, sp. gr. 0.921, will dissolve a considerable quantity of the active parts; the latter is, therefore, undoubtedly preferable for the preparation of the extract.

These two examples are sufficient to show the inconvenience that may result from adopting an absolute principle, and extending its application. In extracting the soluble matter contained in plants, it should not be forgotten that the solubility peculiar to each of the principles, when isolated, is no longer the same when several of these principles are associated, and that we must not judge, *a priori*, of the action of solvents upon each of them.

Ibid, from Ibid.

ART. XLIII.—ON THE IMPURITY OF SOME DRUGS.

BY DAVID MURDOCH, ESQ.

1. *Calamine, or Carbonate of Zinc.*

As the calamine, or impure carbonate of zinc, sold in London, had been frequently examined by Dr. R. D. Thomson, and found always destitute of zinc, it became a matter of some interest to ascertain if the same remark applied to the calamine which occurs in commerce in Glasgow. Accordingly, at the request of Dr. Thomson, a specimen was subjected to analysis. The color of this substance is well known to be a light red. When it is boiled with muriatic acid, it effervesces slightly, and becomes perfectly

white, the residue consisting of heavy white powder, which, on being heated on charcoal before the blow-pipe, and then digested in acid, gives out the smell of sulphohydric acid; and when fused with carbonate of soda and digested with water, sulphate of soda is formed and carbonate of barytes remains unacted on. The main constituent of the commercial calamine is thus, obviously, sulphate of barytes. To ascertain if any zinc was contained in the red powder, the acid solution which was boiled upon it was mixed with a quantity of caustic ammonia in excess, which precipitated the peroxide of iron and alumina. This precipitate was filtered, and the ammoniacal liquid which passed through the filter was precipitated by oxalate of ammonia. The oxalate of lime was thrown on a filter, and the washings evaporated to dryness and heated to low redness in a platinum capsule. No residue was left; showing the absence of zinc and magnesia.

140.11 grains of calamine gave, in one analysis, sulphate of barytes and some silica, 128.05 grains; peroxide of iron and alumina, 11.55 grains; water, 0.51 grains; and the results of two analyses were as follow:—

	I.	II.
Sulphate of barytes,	88.74	89.77
Peroxide of iron and alumina,	8.01	5.74
Carbonate of lime,	2.90	4.40
Water,	0.35	0.35
	<hr/>	<hr/>
	100.	100.26

Dr. Thomson having suggested that the mode in which this adulterated article was manufactured was by mixing together a portion of the American bole, chalk, and sulphate of barytes, the next object was to examine American bole, for the purpose of comparison. The following are the results of several analyses of this substance, which is used extensively for coloring tooth-powders, &c., by druggists. The fourth analysis was made by my brother, Mr. James Murdoch:—

	I.	II.	III.	IV.
Silica,	50.15	47.31	....	49.38
Peroxide of iron,	22.69	32.96	31.	30.44
Alumina,	11.46	....	....	6.90
Lime,	6.43	....	....
Water,	....	....	....	7.04
Sulphate of lime,	....	....	....	8.30
Magnesia,	....	....	....	1.98

To determine if any silica was contained in the sulphate of barytes of the adulterated calamine, the sulphate was fused with carbonate of soda, the fused mass washed with water until the sulphate of soda was removed, and then the residue was digested in dilute muriatic acid. A portion of silica remained undissolved; the quantity was not determined, but it is obvious that the calamine contains all the substances existing in American bole, and the conclusion is scarcely avoidable that the color is caused by the presence of this body.

2. *Precipitated Sulphur.*

This substance, also termed milk of sulphur and washed sulphur, is properly prepared by boiling sulphur with lime or potash, precipitating the solution with muriatic acid, and throwing the precipitated sulphur on a filter and washing it. If this form of sulphur were always prepared in this manner, no impurity would exist in it. But it has been observed that this article, in London, at least, contains always above one-half its weight of impurity. To ascertain if this substance in Glasgow was equally impure, 53.85 grains were ignited in a platinum capsule, and were found to lose 29. grains. This would make the composition of the sulphur—sulphur, 49.27, and sulphate of lime, 50.73. But as the gypsum was in crystals, it obviously contained its water of crystallization, which must therefore be calculated. The constituents of hydrous gypsum are— $\text{Ca O} = 3.5$ $\text{S O}_3 = 5$ $2 \text{ H O} = 2.25 = 10.75$. The quantity of water belonging

to the sulphate of lime found in the analysis will therefore be 13.42 per cent. The true constituents, then, are,—

Sulphate of lime,	50.73
Water of crystallization,	13.42
Sulphur,	35.85
	<hr/>
	100.

3. *Oxide of Zinc.*

This oxide generally effervesces on the addition of an acid, proving the presence of carbonate of zinc, or of the carbonate with which it has been precipitated. When, to the solution of this oxide in muriatic acid, an excess of caustic ammonia is added, some brownish-red flocks of peroxide of iron remain undissolved, containing, perhaps, a little alumnina, amounting to about one-half per cent.

4. *Red Oxide of Iron.*

This oxide, as sold in the shops, has been examined by my brother, Mr. James Murdoch, and found to contain a small percentage of alumina.

5. *Tartar Emetic.*

This salt generally contains a small quantity of peroxide of iron.

Glasgow College Laboratory, April, 1844.

Pharmaceutical Journal.

NOTE BY DR. R. D. THOMSON.

The first person who published an account of the extraordinary mixture called Calamine in the shops, was Mr. Brett, in the *British Annals of Medicine*, vol. i., p. 485. He found, however, traces of lead and zinc in the specimens which he analysed, a circumstance which has never occurred to me, either before or since that period. It is possible,

therefore, that the specimens may vary slightly; sulphate of lead is a probable ingredient, in minute quantities; but I very much doubt if the manufacturer of this article is honest enough to supply his customers with even a trace of zinc. It is not a little remarkable that this adulterated article should have for so long a period been infesting every drug-shop, to the utter exclusion, apparently, of the genuine article in England and Scotland, without any complaint from those who purchased it. Does this fact not prove that as calamine is used in the form of ointment, it is the lard which is the efficient application? Mr. George Schweitzer, of Brighton, first published an account of the impure milk of sulphur in the *British Annals of Medicine*, in 1837, vol. i., p. 618, and showed that the sulphate of lime was introduced by substituting sulphuric acid for muriatic acid in the precipitation of the sulphur from its base. I may mention that this adulteration is easily detected by the microscope, the crystals of sulphate of lime being very apparent. It is not easy to discover any other method of excluding such adulterated articles from commerce, unless by the acquisition of a scientific knowledge of chemistry by the druggists of this country.

London Lancet.

ART. XLIV.—DESCRIPTION OF THE FRANKINCENSE-TREE, AS FOUND NEAR CAPE GARDUFOI, ON THE SOMAULI COAST.

BY CAPTAIN G. B. KEMPTHORNE,

Indian Navy, Commanding the Hon. Company's Sloop of War "Clive."

AT Bunder Cassim, about one hundred miles to the eastward of Berbera, the mountains come close down to the coast; there is a pass and road over them, and a few hours' walking will, it is said, lead to a fine climate, and to a beautifully fertile country, abounding in the elephant, the rhinoceros, and the lion, and thickly populated by pastoral tribes. Several rivers take their source in the high land, and flowing to the southward and eastward, fall into the Indian ocean, four or five degrees north of the equator.

The chief town of the Mijertheyn Somauli is at Bunder Maryah, which lies twenty miles south-west of Ras Feeluk. The range is here about 5000 feet in altitude, and three miles from the shore. Ascending 1000 feet, a wide plain presents itself, bounded on every side by precipitous mountains, studded with the dragon's blood, frankincense, and gum acacia-trees, but looking bare and naked from the total absence of underwood.

The *luban* or frankincense assumes the most singular aspect, from the fact of its invariably growing from the bare and smooth sides of the white marble rocks of which these hills are composed, without any soil whatever to nourish or the least fissure to support it. Many of the trees have even attached themselves to the huge masses that have rolled down into the valley, and now lie over the stony surface. From the base of the trunk, and about treble its diameter, a very round thick substance is protruded, of a nature between bark and wood. This adheres

most firmly to the stone, and at a distance resembles a mixture of mortar and lime. From the centre of the mass the stem, having first taken a bend or curve outward of several inches, rises straight up to a height of forty feet. It throws from the top short branches, covered with a very bright green foliage, the leaves being narrow and rounded at the end, five or six inches in length by one broad; crimped, like the frill of a shirt, or rather bearing a stronger resemblance to that beautiful species of seaweed found along the coast of England, and styled by urchins, "the old gentleman's ruffles."

From a foot to eighteen inches is the usual girth of the stem, and it tapers gradually away to the summit. The bark is perfectly smooth, and consists of four distinct layers. The outermost of all is very thin, and similar to that of the beech. The two next are of a singularly fine texture, resembling oiled letter-paper, perfectly transparent, and of a beautiful amber color. It is used by the Somauli to write upon. The inner bark of all is about an inch thick, of a dull reddish hue, tough, and not unlike leather, but yielding a strong aromatic perfume. The wood is white and soft, and might be applied to many useful purposes. By making a deep incision into the inner rind, the gum exudes profusely, of the color and consistency of milk, but hardening into a mass by exposure to the atmosphere.

The whole mountain-range from Bunder Maryah to Cape Gardufoi is composed of limestone and marble; and near the latter place, especially, the marble is so white and pure that it approaches to alabaster. Pink and greyish-black are also common colors; and in parts it might be mistaken for sandstone, until chipped off with the hammer. On the plain visited, the frankincense is nowhere to be found resting upon the ground, or upon any sort of soil; and the purer the marble to which it adheres, the finer the growth of the tree. It would seem that this singular production of the vegetable world derives its sole nourishment from car-

bonate of lime. The young trees produce the best and most valuable gum; the older merely yielding a clear glutinous fluid resembling copal varnish, and exhaling a strong resinous odor.

During the south-west monsoon, the pastoral tribes in the neighborhood of Ras Feeluk collect large quantities of frankincense, which they barter to the Bonians, of whom a few reside at the villages along the Abyssinian coast. Boats from Maculla, and from other ports on the opposite Arabian shore, also come across during the fine season, and carry away the gums that have been accumulated, and which are exchanged for a coarse kind of cotton cloth worn by the Somaui.—*Harris's Highlands of Æthiopia*, vol. i., p. 417. 2d edit. 1844.

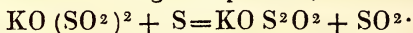
[There are two kinds of olibanum or frankincense described in pharmacological works, one called *Indian olibanum*, which is obtained from the *Boswellia surata*, the other denominated *African* or *Arabian olibanum*. The latter is obviously the one referred to by Captain Kempthorne. As found in commerce, it is always intermixed with crystals of carbonate of lime. No botanical description of the tree yielding it has yet been published.—*Ed. Pharm. Jour.*

ART. XLV.—ON THE PREPARATION OF THE HYPOSULPHITE AND OF THE TRITHIONATE OF POTASH.

BY M. PLESSY.

M. LANGLOIS, to whom the discovery of trithionic acid is due, obtains it in combination with potash in the following manner:—He prepares some bisulphite of potash by passing sulphurous acid in excess into a solution of pure carbonate of potash. The salt thus obtained is introduced into a vessel containing pure flowers of sulphur, and the whole digested on a sand-bath, the temperature of which should not cause it to boil. Sulphurous acid is disengaged, and some sulphate is produced; the liquid assumes a yellow tint, which disappears at the end of two or three days, when the formation of the new compound is complete. The liquid, filtered whilst hot, becomes opaque on cooling, and deposits some crystals, which are coated with a little sulphur. They are purified by dissolving them in a small quantity of warm water; the filtered solution no longer becomes opaque, and furnishes very beautiful prismatic crystals.

When therefore sulphur is dissolved in the bisulphite, a liquid is obtained, which deposits a quantity of sulphur on boiling, and affords but a small quantity of the trithionate of potash and of an impure hyposulphite. The reaction does not take place in the manner first supposed; and although sulphurous acid is disengaged under the circumstances in which M. Langlois operated, we cannot have



This evolution of sulphurous acid, observed by M. Langlois, does not always happen; thus it does not take place at 77° to 86°, and nevertheless the sulphur dissolves in the bisulphite. But if the bisulphate of potash is not adapted for the preparation of the hyposulphite, the neutral sulphite does perfectly well.

I will describe in a few words the process which I have adopted for preparing the hyposulphite of potash from the neutral sulphite. It may be of some service, as pure hyposulphite of soda may equally be obtained by it; and this is now a very important object of commerce.

Bisulphate of potash is prepared as above described; the carbonate of potash is wholly converted into bisulphite when the sulphurous acid passes off without dissolving. This is then converted into the neutral salt by adding carbonate of potash until it produces no further effervescence; the neutral sulphite, thus prepared, is boiled in a capsule or flask with flowers of sulphur, for fifteen or twenty minutes, stirring frequently with a glass rod to facilitate the solution of the sulphur. The liquid separated from the excess of sulphur is evaporated over the fire to a syrupy consistence; if any sulphate has formed in the course of the operation by the absorption of oxygen, a portion of the salt separates at this point of concentration. The clear liquid is decanted after 24 hours' standing, and again concentrated, which however does not determine the precipitation of a fresh quantity of sulphate, and in the course of 24 hours beautiful crystals of hyposulphite gradually form in a dry place.

The presence of the sulphate, far from being disadvantageous, causes the hyposulphite to crystallize better than from a pure concentrated solution. The crystals as obtained are perfectly colorless, transparent and hard, very soluble in water, not deliquescent, and contain 2 equiv. water of crystallization.

The hyposulphite of soda may be purified by melting it in its water of crystallization; on cooling, very beautiful crystals of hyposulphite separate, which are removed from the liquid containing the impurities.

I will now proceed to describe the process I employ for preparing the trithionate of potash.

I obtain this salt by the action of sulphurous acid on the hyposulphite of potash. This very remarkable action in

some degree explains the formation of $S^3 O^5 KO$ by M. Langlois's process. In fact, it may be admitted that the sulphur, on dissolving in the bisulphite of potash, forms hyposulphite; and that the excess of sulphurous acid, instead of being disengaged, reacts upon this salt so as to produce the trithionate. This supposition, in fact, led me to examine the action of sulphurous acid on the hyposulphite of potash.

The following is the method I employ for the preparation of M. Langlois's salt:—

I procure a solution of hyposulphite of potash, so concentrated that it will not mix with alcohol of 0.851 spec. grav. When dry or crystallized hyposulphite of potash is conveyed into water to which about $\frac{1}{3}$ volume of this alcohol has been added, the alcohol separates at a certain period, and comes to the surface. I add then no more salt, and pass through some sulphurous acid, generated from sulphuric acid and powdered charcoal; the solution of the hyposulphite is, however, previously heated to about 77° or 86° . If the disengagement of the gas is rather rapid, this temperature maintains itself. From time to time a little hyposulphite is added, taking care that the temperature always remains constant. When the liquid acquires an intense yellow color, and gives off the smell of sulphurous acid, the disengagement of this gas is discontinued, and after some hours, in the course of the night, the liquor becomes colorless, quite loses the odor of sulphurous acid, and deposits a large quantity of crystals. The alcohol which floated on the surface now mixes with the liquid, which indicates that a fresh quantity of hyposulphite should be added, and more sulphurous acid passed through, if a greater quantity of crystals is desired.

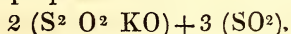
When a sufficient quantity of these crystals has been obtained, they are dissolved in water at 122° or 140° , the solution filtered to separate the sulphur they contain, and then an eighth of its volume of alcohol of 0.851 spec. grav. added

to the filtered liquor; it is again heated a little, and the solution furnishes on cooling perfectly pure, beautiful quadrilateral prisms. Their taste is slightly saline and bitter. On exposure to heat, they afford sulphurous acid, sulphur, and leave a residue of 64.36 neutral sulphate of potash; they are neutral, and dissolve readily in water. The aqueous solution is decomposed by sulphuric and nitric acids, with deposition of sulphur and disengagement of sulphurous acid. Hydrochloric acid does not decompose them; they do not give precipitates with solutions of lime, barytes, iron, zinc, magnesia, nickel, &c. They decolorize the red sulphate of manganese, but do not act on a solution of sulphate of copper; they precipitate the salts of protoxide of mercury black, those of the duetoxide blue, and give with the nitrate of silver a yellowish-white precipitate, which soon becomes black. The salt in question consequently possesses all the properties of the trithionate of potash.

The mother-ley of the crystals just described becomes turbid, and deposits sulphur when exposed to a temperature which would not decompose a solution of the trithionate of potash; and on adding some concentrated alcohol, deposits a salt in which crystals are perceptible, the form of which differs from that of the trithionate.

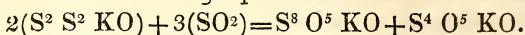
M. Gelis informs me that these crystals must be the tetrathionate, since this salt is likewise produced by the reaction of sulphurous acid on the hyposulphite.

When I became aware that M. Gelis was also investigating this reaction, I had only been able to determine approximately the quantity of sulphurous acid absorbed by a given weight of hyposulphite. I had observed, without, however, being certain of my results, that the absorption took place in the proportion of



A deposit of sulphur is always formed when concentrated liquors are acted upon. It became important to ascertain whether this deposit took place when dilute solutions were

employed. I found that none forms in this case, and nevertheless there is absorption of sulphurous acid. MM. Gelis and Fordos have, however, analysed this reaction, and have been led to the following equation:—



The tetrathionate can be removed from the mother-ley from which the trithionate of potash was deposited. It is a white salt, not stable, but which keeps well enough in contact with the air when in the state of crystals and dry.

When the absorption of sulphurous acid by the hyposulphite of potash has determined the precipitation of a certain quantity of trithionate and of the tetrathionate of potash, some sulphate is found in the liquor. I have observed it form when access of air has been prevented; for when a recently prepared solution of sulphurous acid in boiled distilled water is passed under a bell-glass over mercury, and then a sufficient quantity of crystallized hyposulphite free from sulphate introduced, the sulphurous acid will be found to be completely absorbed after four-and-twenty hours, and the liquid forms a precipitate with chloride of barium, which does not dissolve entirely in dilute hydrochloric acid.

Chemical Gazette, from Ann. de Chim. et de Phys.

ART. XLVI.—INVESTIGATIONS CONCERNING CREOSOTE.

BY M. H. DEVILLE.

THE studies concerning the resins and essences which the Academy has been kind enough to encourage, have led me to think that it is necessary to consider the action of fire on these latter as not being a purely disorganising action. This action would be, on the contrary, in my opinion, incapable of effecting a profound change in the state of combination of the substances which constitute a body so complex as a resin. As it is generally admitted that an essential oil, homogeneous or not, has given rise, by its alteration in the vegetable, to the resin, the action of the fire on the latter would furnish a principal product identical with the primitive essential oil, or at least isomeric with it; it is thus we may find, or at least recognize, the essential oils from which benzoïn, guaiacum, and other resins are procured, in which these oils have entirely disappeared.

This hypothesis, applicable to a certain number of resinous substances, I have already verified as regards some of them: creosote again gives me an opportunity of returning to it. Indeed, all my experiments lead me to believe that creosote is nothing more than an essential oil, or a substance isomeric with it, produced in the distillation of the resinous matters contained in wood.* We find here the same circumstances in which hydroguret of guaïacyle is formed by means of guaïacum.

Creosote and hydroguret of guaïacyle have analogies which are never *wanting*. The same reactions, the same chemical and physical properties correspond in a remarkable manner,

* It is thus explained how creosote varies in composition with the quality of the woods from which it is extracted, and why certain woods do not yield it.

notwithstanding the difference of composition. The hydroguret of guaïacyle ($C^{28} H_{16} O^4$) may be regarded as an oxide of creosote, ($C^{28} H_{16} O^2 = 2$ volumes of vapor.)

Creosote colors blue a great quantity of water containing a trace of a salt of peroxide of iron; with the hydroguret of guaïacyle, the coloration is brown. Creosote represents, by its composition, alcohol of the benzoïc series. Bromine gives a crystallized acid with creosote, half of whose [hydrogen is replaced by bromine, equivalent for equivalent.

Hydroguret of guaïacyle and creosote, treated by sulphuric acid and chromate of potassa, give rise to a salt of chromium analogous to tartrochromic acid. From the acid produced with creosote I extract a resin, which appears to me very interesting for the verification of the hypothesis on which I found the formation of creosote in the distillation of wood.

Absolutely pure creosote is not colored in the air. It combines with alkalis and bases, as Reichenbach observed, and its solution is colored blue by the salts of iron. All these properties render it similar to hydroguret of salicylc, beside which it may perhaps be placed by doubling its formula.

The Chemist, from Comptes Rendus.

ART. XLVII — MEMOIR ON ALTERATIONS EXPERIENCED
BY SOME ORGANIC ALKALIS, IN CONTACT WITH, AND
UNDER THE INFLUENCE OF, OXYGEN IN THE NAS-
CENT STATE.

BY M. EUGENE MARCHAND.

WHEN a solution of sulphate of cinchonine, quinine, morphia, narcotine, strychnia, or braccine, is boiled with an excess of peroxide of lead, adding to the liquor, drop by drop, dilute sulphuric acid, until a portion of the filtered liquor is not rendered turbid when tested with either ammonia or caustic potassa, or by the carbonates of potassa or soda, it may be remarked that, from the commencement of the re-action, a brisk effervescence, due to a disengagement of carbonic acid gas is manifested, and that the liquor acquires a deeper and deeper color. By stopping the operation at the moment which I have just noticed, by saturating the free acid which may exist by means of litharge; then by evaporating this liquor to dryness, redissolving the residue by distilled water, in order to submit the solution to a current of hydrogen, and finally evaporating the liquor to dryness, coloring matters are obtained very distinct from each organic alkali, and each of which we will study separately.

PRODUCTS DERIVED FROM CINCHONINE.

This alkaloïd, when it is placed in the conditions which we have just indicated, is converted into a new substance, for which I have proposed the name of *cinchonetine*. It is a coloring matter, which is presented under the form of an uncrystallizable amorphous mass, of a very deep violet color in the mass, and of a yellowish red when in a thin layer. It is deliquescent, and possessed of a bitter taste. When incinerated, it enters into fusion, gives off, like cinchonine,

white odorous vapors, containing no ammonia; it inflames, burns with a fuliginous flame, and leaves, as a residue, charcoal which is very difficult to incinerate.

Cinchonine dissolves more easily in boiling water than in cold water. Its best solvent is alcohol. Ether has no action on it. Concentrated sulphuric acid very readily dissolves it with a red color, and without appearing to make it undergo any alteration. If this solution be diluted with water, it assumes a yellow tint, and is not turbid.

The aqueous solution of cinchonetine, which is colored red, does not become turbid under the influence of ammonia or potassa, but, by its contact with these reagents, it assumes a purple color, which afterwards passes to fawn yellow, and the acids cannot restore to it its primitive color. The subacetate of lead occasions in this solution (which chlorine instantaneously deprives of color) a violet precipitate, which is deposited in a few moments.

Cinchonetine may, in contact with peroxide of lead, and under the influence of sulphuric acid, be converted, by aid of heat, into new colorless compounds, among which it appears acetic acid may be reckoned.

PRODUCTS DERIVED FROM QUININE.

The result of the action exerted by the nascent oxygen on this organic base, as a complex matter which acts under the influence of heat, in a manner analogous to cinchonetine, and which may be separated into at least two distinct principles, quinetine and modified quinetine. The first of these bodies is that which remains when the complex coloring matter is treated by water: it is insoluble in this liquid, but it dissolved in alcohol, to which it imparts a violet color. Modified quinetine is, on the contrary, the principle which water dissolves, acquiring a blood-red color.

Modified Quinetine.

It is presented under the form of an amorphous mass, of a red color, of a bitter taste, soluble in water, alcohol, and

ether. Its aqueous solution, when it is boiled in order to evaporate it to dryness, is decomposed, depositing a black powder, insoluble in alcohol and ether.

Potassa and ammonia decolor the aqueous solution of this substance, which from red passes to a dirty yellow, but without causing it to undergo any modifications, as is the case with cinchonetine, for the original color may always be restored by saturating the alkali with sulphuric acid. Modified quinetine dissolves in concentrated nitric and sulphuric acids, communicating to them its color.

Quinetine.

By the spontaneous evaporation of its alcoholic solution, this substance may be obtained in great part crystallized. It is insoluble in water, but it dissolves very well in alcohol, ether, and water acidulated with sulphuric acid. It communicates to the first two solvents a violet color, and to the last a red color. Although this substance is insoluble in water, its alcoholic solution is not rendered turbid when diluted with this liquid.

Potassa and caustic ammonia act with it in the same manner as with modified quinetine.

The concentrated acids dissolve quinetine, acquiring a red color. It is probable that it then passes to the state of modified quinetine.

By successive solutions and evaporations, quinetine may be rendered soluble in water, and then it appears to present all the characters of modified quinetine.

PRODUCTS DERIVED FROM MORPHIA.

Morphetine is the product of the oxidation of this base, when it is submitted to the above-mentioned influences. It is a brown, amorphous substance, possessed of a feeble, bitter taste ; sparingly soluble in alcohol at 90° C., which it colors yellow ; very soluble, on the contrary, in distilled water, to which it communicates, at the same time, a yel-

low color verging on red, and the property of reddening litmus paper. Sulphuric and nitric acids turn to pale yellow the color of this solution, which becomes, on the contrary, deeper under the influence of caustic alkalis. This solution is not rendered turbid nor altered by triacetate of lead.

Concentrated sulphuric acid only very difficultly dissolves morphetine. Nitric acid, on the contrary, readily dissolves it, acquiring a yellow color.

Morphetine, submitted in its turn to the action of peroxide of lead, until no more effervescence is produced, is converted into a yellow, uncrystallizable matter, endowed with acid properties.

PRODUCTS DERIVED FROM NARCOTINE.

When this alkaloïd is submitted to the action of oxygenising bodies, and in the conditions which we have described above, a new coloring matter is obtained, *narcoteïn*, which is presented under the form of an amorphous or crystallizable mass, of a brown color, and possessing a very bitter taste. It is very sparingly soluble in ether, but it dissolves very readily, on the contrary, in alcohol and in water. It is soluble in concentrated nitric acid, which it colors yellow. It likewise dissolves with great facility in concentrated sulphuric acid, to which it communicates a magnificent red color, from which it passes to yellow when this solution is diluted with water.

The aqueous solution of narcoteïn is of a yellow color; when ammonia or caustic potassa is added, the color becomes rather brighter, and even passes to yellowish-red. Subacetate of lead does not alter either its color or its transparency.

Narcoteïn, when submitted to the action of nascent oxygen until effervescence ceases, is gradually decolorized, and is converted into a new body, the opianic acid, formerly obtained by Liebig and Wohler, in their experiments on the oxidation of narcoteïn.

PRODUCTS DERIVED FROM STRYCHNIA.

The most remarkable product obtained by submitting strychnia to the action of nascent oxygen is a pulverulent mass, of a brownish-yellow color, insoluble, or very sparingly soluble in boiling water, which it colors of a dirty yellow, and to which it communicates a bitter taste, extremely sparingly soluble in alcohol, soluble in ether, soluble also in water acidulated with sulphuric acid, and boiling, from which it is in great part precipitated by cooling.

The best solvent of this substance is caustic potassa; the solution is of a brown color, and, if we employ only as much potassa as is strictly necessary for operating its solution, the liquor is without action on syrup of violets. When sulphuric acid is added to the solution, so as to communicate to it an acid reaction, it becomes turbid, and deposits a flocculent and yellowish precipitate. The perfectly neutral alkaline solution has no action on the solution of iron and copper; but it precipitates the solutions of lead and silver. This substance deserves to fix the attention of chemists. The remarkable manner in which it acts with caustic potassa, which it seems to saturate completely, will, perhaps, cause it to be regarded as a *new acid*.

PRODUCTS DERIVED FROM BRUCIA.

The coloring matters which result from the action of oxygen on this alkaloïd are two in number. The first is soluble in boiling alcohol at 90° C., which it colors of a yellowish-red. We shall study it in A. The second, which will be studied in B, is insoluble in alcohol at 90° C., but it readily dissolves, on the contrary, in this liquid boiling, and diluted with half its weight of distilled water. The solution which results from it possesses a fine red color.

A. This is a brown, uncrystallizable substance, possessing a very bitter taste, and very sparingly soluble in ether soluble in boiling alcohol at 90° C.; soluble in distilled water, which it colors of a yellowish-red; it is soluble in con-

centrated nitric acid, producing a red color as beautiful as that resulting from the action of this acid on brucia. Sulphuric acid also dissolves it, but more slowly, and likewise assumes a very fine red color. Hydrochloric and acetic acids, as well as caustic potassa, also dissolve it very well, but they take a yellow color.

B. This substance, like the foregoing, is uncrystallizable; its taste is bitter, and it has a red color when in a thin layer, and black when in a mass. It is insoluble in ether and in boiling alcohol at 90° C. It dissolves very well in this latter liquid when diluted with water. It dissolves in distilled water, to which it communicates a beautiful wine-red color, which the acids render rather brighter, whilst caustic potassa turns it rather brown, and the subacetate of lead yellow.

Concentrated sulphuric and nitric acids dissolve this substance, as also does caustic potassa, acquiring a more or less deep yellowish-red color.

The experiments which constitute the subject of this memoir are still very incomplete. Most of the bodies whose existence I have noticed have not probably, been obtained in the perfectly pure state. The new investigations are, therefore, necessary: they will form the subject of a second memoir, which I will terminate with some reflections concerning the nature of the phenomena which accompany these curious metamorphoses of the organic alkalis.

Ibid, from Journal de Chimie Médicale.

ART. XLVIII.—ON THE MEANS OF ASCERTAINING THE ADULTERATION OF POTASSA BY SODA, AND DETERMINING IN A SIMPLE MANNER, THE PROPORTION OF THE LATTER.

BY E. F. ANTHON, OF WEISGRUN.

THE following prize question, proposed among other subjects by the *Société de Pharmacie*, of Paris, "*to give an easy and commercial process for detecting the presence and proportion of soda in the potassa of commerce,*" induced me to undertake this work.

In order to find a process of this nature, proper for determining the proportion of soda in potassa, adulterated by this alkali, and of giving a satisfactory result, with respect to celerity and accuracy, even in the hands of persons unacquainted with chemistry, it was necessary to submit to a more attentive examination the processes hitherto employed for separating the salts of soda from those of potassa.

A process ordinarily employed in analysis, and which presents also the necessary accuracy, is that of Berzelius; it consists in converting the two alkalis into metallic chlorides, evaporating to dryness, and heating in a platinum crucible to the commencement of redness, and then weighing. The saline mass thus obtained should be mixed with $3\frac{3}{4}$ times its weight of crystallised chloride of platinum and sodium, which may also be replaced by a solution of chloride of platinum, to which a small quantity of chloride of sodium has been added. It must afterwards be dissolved in very little water, evaporated almost to dryness at a very gentle heat, and then treated by alcohol of 60 per cent. The chloride of sodium is dissolved in it as well as the chloride of platinum and sodium added in excess, and the chloride of platinum and potassium forms an insoluble residue, which must be washed on a filter with alcohol.

The chloride of platinum and potassium, after having been washed, is maintained at a very gentle heat, until several weighings show that it loses no more in weight. The quantity of chloride of platinum and potassium obtained, serves for calculating that of the potassa or chloride of potassium. One part of chloride of platinum and potassium corresponds to 0.19334 of potassa, or 0.30565 of chloride of potassium. Finally, the quantity of chloride of sodium is found by subtracting the quantity of chloride of potassium found from the total weight of the two metallic chlorides, and the quantity of soda is then deduced by calculation. One part of chloride of sodium corresponds to 0.53289 of soda.

This process is not at all applicable to the object in question : in the first place, on account of its expense ; and in the next place, because it requires an experienced chemist ; and also because almost all kinds of potassa contain chloride of potassium or chloride of sodium, or else both chlorides at once, and a more or less inaccurate result must then be obtained, according to the proportion of the two metallic chlorides contained in potassa, if care have not been taken previously to ascertain their quantity, that they may not be reckoned in the second instance.

I have said sufficient to show that this process of separation, however valuable it may be, is not very applicable to the object in question.

Another process of separating potassa from soda has been indicated by Serullas. It is based on the property of perchloric acid, of giving with potassa a compound very sparingly soluble in water and insoluble in alcohol, and with soda on the contrary—a compound very soluble in water, as well as in the strongest alcohol. The operation is ordinarily performed by adding an excess of perchloric acid to the solution containing the salts of potassa and soda, and cautiously evaporating the mixture, almost to dryness. The mass obtained is then treated by alcohol, which dissolves the perchlorate of soda, with the acid which was previously combined with the two alkalis, in the case when

the perchloric acid is not driven off under the form of gas, and leaves, on the contrary, the perchlorate of potassa. The two perchlorates are then cautiously calcined, and they are converted, with a disengagement of oxygen, into chloride of potassium and chloride of sodium, which serve for calculating the quantities of potassa and soda.

Although this second process is not so expensive as the preceding, the other objections apply to it; for not only does it require too much chemical skill, but it likewise gives an inaccurate result, since the potassa of the chloride of potassium, and sulphate of potassa contained in the potassa, is found in the result, and because it is necessary, consequently, previously to make an accurate determination of the impurities accidentally or purposely mixed with the potassa.

All the re-agents which are now employed for detecting potassa and separating it from soda, such as the tartaric, hydrofluosilicic, and carbazotic acids and sulphate of alumina, are, more or less, liable to the objection of indicating not only the alkali combined with the carbonic acid, but also that combined with the sulphuric and hydrochloric acids, &c., and not being able, consequently, to give an accurate result without a previous and minute determination of the accidental mixtures of potassa.

It should, therefore, rather be possible to find, in the capacity of saturation of potassa and soda, a means of solving the question; for, by comparing the capacity of saturation of potassa with that of soda, we find a very considerable difference. Thus, for example, 100 grains of dry simple carbonate of potassa require for their neutralisation 1,000 grains of pure dilute sulphuric acid, (for alkalimetry) which contains nearly $8\frac{1}{2}$ per cent. of anhydrous acid, whilst 100 grains of anhydrous carbonate of soda require nearly 15 per cent. of the same acid for their neutralisation.

It would, therefore, be sufficient to establish, by calculation, a Table in the following form for each hundredth, in order to be able, only after the employment of an alkalimetric

test acid, to obtain immediately the indication in hundredths of the proportion of soda contained in potassa.

A anhydrous carbonate of potassa, 100 grains of which require, for their neutralisation, the following quantities of dilute sulphuric acid (of the specific gravity of 1.0687),

Contains the following numbers of hundredths of anhydrous carbonate of soda :—

1000	0
1025½	5
1051	10
1102	20
1127½	25
1255	50
1382	75
1510	100

Although such a Table may serve for determining with sufficient accuracy for the object in question, and very promptly, the proportion of soda which might be found in a pure carbonate of potassa, it is not, however, applicable to testing the various kinds of potassa of commerce, especially because all, even without being adulterated, contain different accidental mixtures, such as chloride of sodium, chloride of potassium, sulphate of potassa, silica, &c., and because, so long as we are unacquainted with the quantity of all these substances united, and have not subtracted them from the weight of the dry potassa, the preceding Table cannot be made use of with clearness; for, admitting that a potassa contains, for example, 80 per cent. of carbonate of potassa, 6.7 per cent. of accidental impurities, and 13.3 per cent. of anhydrous carbonate of soda, this potassa should, according to this Table, be regarded as pure and dry carbonate of potassa, for the 13.3 of anhydrous soda found in it would require for their neutralisation nearly as much alkali-metric test-acid as 20 of pure and dry carbonate of potassa.

But even when it is wished summarily to determine previously the quantity of accidental impurities of potassa, to subtract them from 100 grains of potassa, and to reduce to 100 the number obtained after the neutralisation, an accurate result cannot be arrived at, because we rarely find in commerce a potassa which contains only simple carbonate of potassa, without any mixture of free caustic potassa, or, which is most common, of sesquicarbonate of potassa, and in both these cases the numbers indicated in the Table would be inaccurate; for if a pure potassa, submitted to examination, contained free caustic potassa, we should, from the employment of the test-acid, maintain, according to the foregoing Table, that this potassa contained soda, whilst at another time we should declare to be free from adulteration a potassa containing much sesquicarbonate of potassa, and which would not be mixed with too great a quantity of soda. It is evident, therefore, that this Table would be applicable only after having first not only removed from the potassa submitted to examination all the foreign mixtures, with the exception of soda, but also after having transformed into simple carbonate the alkali obtained, if this were potassa alone, or mixed with soda; but as this operation would be too difficult, and would require too much chemical skill, this mode of testing, to ascertain the proportion of soda contained in potassa, cannot be admitted, at least as an ordinary process.

The same observation is applicable to the case in which it is desired to calculate the proportion of soda contained in a potassa by the increase of weight which takes place when moistened potassa is exposed to an atmosphere of carbonic acid until there is no further augmentation of weight, or by the loss of weight produced by the expulsion of carbonic acid by potassa by a more energetic acid; indeed, these two processes could be used only for operating on mixtures of pure simple carbonate of potassa with anhydrous simple carbonate of soda.

All these considerations show the difficulties which the solution of the problem entails.

I then asked myself whether it would not be possible to effect a separation by converting the alkaline carbonates of the potassa to be examined into bicarbonates, and then separating by means of a solution of bicarbonate of soda, completely saturated at the ordinary temperature, the bicarbonate of soda formed from the bicarbonate of potassa; for, on one hand, a saturated solution of salt cannot naturally dissolve more of the same salt at the same temperature, whilst, on the other hand, it might be expected that the solution of bicarbonate of soda would dissolve not only the bicarbonate of potassa, but also the accidental impurities of the potassa, such as the chloride of potassium, the chloride of sodium, the sulphate of potassa, &c., and would leave only the bicarbonate of soda rising from the simple carbonate of soda contained in the potassa, and which would enable the quantity of this carbonate to be readily calculated.

In order to ascertain whether this idea was practically executable, I wished first to convince myself of the solubility of sulphate of potassa, chloride of potassium, and chloride of sodium, (the ordinary impurities of potassa) as well as of bicarbonate of potassa in a solution of bicarbonate of soda: I weighed with this object four times 1,000 grains of a solution completely saturated at 54.5°F. , of carbonate of soda, and I added to them these four salts by grains, until they were no longer dissolved. When the last grain added remained at the bottom of the vessel without being dissolved, after the liquor had been carefully stirred, and at a temperature of 54.5°F. , I found that there was dissolved in 100 parts of the solution of bicarbonate of soda—

Bicarbonate of potassa	- - -	245 grains
Sulphate of potassa	- - - -	180 “
Chloride of potassium	- - -	285 “
“ sodium	- - - -	75 “

After having determined these proportions, I endeavored to convert into bicarbonates, by carbonic acid, mixtures, expressly prepared, of soda moistened with a solution of bicarbonate of soda ; but I found that not only was this object slowly attained, but that it could be only incompletely fulfilled in a simple manner. I could not saturate with carbonic acid a complete solution of these two mixtures in water, because it is necessary to drive off all the water of the solution in order to be able to separate from each other, by a concentrated solution of bicarbonate of soda, the crystallized salts obtained. I therefore tried, in order to avoid this inconvenience, to dissolve in a solution of bicarbonate of soda, saturated cold, new mixtures, (of 100 grains) expressly prepared, of soda and potassa ; this operation likewise succeeded well, and nothing remained undissolved except the silica.

I then passed for three days, a continued current of carbonic acid into these solutions thus prepared, of mixtures of potassa and soda, to which I also joined a simple solution of potassa in the concentrated solution of bicarbonate of soda.

The solution, which contained only potassa, presented, even at the end of several days' saturation by carbonic acid, no separation of bicarbonate of potassa or soda, and the liquor had not undergone (at least in appearance) the slightest change.

A solution, which contained a mixture of 90 grains of potassa and 10 grains of anhydrous carbonate of soda, gave by a current of an excess of carbonate acid a crystalline precipitate of bicarbonate of soda, which collected on a filter and pressed between folds of blotting paper, weighed, while damp, 19 grains ; its weight was 14.6 grains after it had been completely dried at the ordinary temperature.

A filtered solution of 80 grains of potassa and 20 grains of anhydrous carbonate of soda, treated in the same manner, gave 22.7 grains of bicarbonate of soda, pressed and still

moist, and 16.9 grains of the same salt dry. A solution of 70 grains of potassa and 30 grains of anhydrous carbonate of soda, gave 44.1 of humid bicarbonate of soda, and 36.7 of the same salt dry.

A solution of 60 grains of potassa and 40 grains of anhydrous carbonate of soda gave, by the same process, 59.1 of humid bicarbonate of soda, and 49.7 of the same salt dry.

Finally a solution of 50 grains of potassa and 50 grains of anhydrous carbonate of soda, gave 72.2 of humid bicarbonate of soda, and 58.6 of the same salt dry.

If we examine this result a little nearer, we shall find that the quantities of bicarbonate of soda obtained are too small.

For the following quantities of simple carbonate of soda—	Should give the following quantities of crystallized bicarbonate:—
---	--

10	17.5
20	35
30	52.5
40	70.0
50	87.5

But they gave only—

Deficiency :

14.6	2.9
24.9	10.1
36.7	15.8
49.7	20.3
58.5	29.0

This too small produce is also increased by the impossibility of driving off all the liquid by means of the simple pressure of the bicarbonate of soda separated and collected on a filter, and it indeed suffered an increase of weight proportionate to the fixed principles contained in the quantity of the liquid which was not separated by pressure. Moreover, this difference would be insignificant, and it would be easy to calculate it by the weight of the bicarbonate of soda obtained in the humid and dry states, according to the

known proportions of the concentrated solution of bicarbonate of soda, if there were not other obstacles. If, now, we seek for the reason why too little bicarbonate of soda was obtained we find it in the extreme difficulty of converting into bicarbonates, by a current of carbonic acid, a mixture of soda and potassa dissolved in a solution of bicarbonate of soda; for, at the end of three days' passing of carbonic acid into a solution of potassa, mixed with only a very small quantity of soda, the liquor had always an alkaline reaction, proving that all the alkaline carbonate had not been converted into bicarbonate: this circumstance renders this process, also, insufficient for the same sure and prompt determination of the quantity of soda contained in the potassa, although it may always be used for an approximative determination, as the foregoing investigations manifestly show.

Moreover, as potassa (simple carbonate) cannot take water of crystallization, whilst anhydrous soda (this is the state in which it is found in the potassa which it serves to adulterate,) on the contrary, absorbs a very considerable quantity of it, in order to form crystals, it was natural to hope to determine, approximatively at least, the quantity of soda which might be found in the potassa, by estimating the proportion of water necessary for reducing a given quantity of potassa to a state of pappy mass; so that, even after a long time, it will not solidify any more; for it might be foreseen that there should be so much the more soda in the potassa, as more water is required to reduce the potassa to this state.

In order to carry out this idea practically, I prepared the following mixtures of pure simple carbonate of potassa, and anhydrous simple carbonate of soda:—

- | | | | | | |
|----|--------|---------|-----|--------|-----------------|
| 1. | 90 gr. | potassa | and | 10 gr. | anhydrous soda. |
| 2. | 80 | “ | | 20 | “ |
| 3. | 70 | “ | | 30 | “ |
| 4. | 60 | “ | | 40 | “ |

5.	50 gr. potassa and 50 gr. anhydrous soda.		
6.	40	“	60
7.	30	“	70
8.	20	“	80
9.	10	“	90

I then added water by drops to these nine mixtures, until the state of each of them was such that they became no harder, and until they were slightly pasty, and susceptible of being kneaded. Notwithstanding the facility with which this point was attained, by an unfortunate circumstance this operation required a very long time proportionally, for this object was seldom effected in less than forty-eight hours. It is scarcely necessary to observe that, during this time, I prevented as much as possible the access of atmospheric air by covering the vessel, in order not to have false results, by the loss of water evaporating during that time. It was necessary also to take care not to leave the moistened mixtures too long without looking at them, because otherwise it often happens that the mixture hardens to such a degree that it is very troublesome to divide it properly.

After the moistened mixtures had ceased to become harder, when in a homogeneous state, and capable of being gently kneaded, I determined the quantity of water necessary for each mixture separately, and I found that the following quantities had been added :—

		Grains of Water.
To the first mixture	17	
“ second	40	
“ third	57	
“ fourth	68	
“ fifth	80	
“ sixth	95	
“ seventh	107	
“ eighth	118	
“ ninth	130	

It is evident that the result answered, and that the pro-

perty of soda, of being able to absorb a very great quantity of water of crystallization—a property which potassa does not possess—presents to us a means of determining, in an extremely simple manner, although only approximatively, the proportion of soda contained in potassa.

With respect to the accuracy of this process, it doubtless still leaves much to be desired; for I am convinced, from a great number of investigations, that it may yet give rise to an error of two or three per cent., even when we have become familiarized with its execution by considerable practice and that it is a pure chance if the error remains less than a hundredth. Moreover, the impurities which are ordinarily found in potassa do not interfere much with its accuracy; these are ordinarily substances, such, for example, as the sulphate of potassa, chloride of sodium, chloride of potassium, silica, &c., which do not take up water of crystallization, and the quantity of water necessary merely to moisten those ordinary impurities of potassa is so small, that it is not necessary to take account of it.

Moreover, it is necessary, in the examination of a sample of potassa by this process, to commence by freeing it from the water which it contains, by putting it in an oven, or any other warm place—or, better still, to heat it to redness, in order to convert into simple carbonates the sesquicarbonates which it may contain.

Although, according to these considerations, this process cannot be sufficient for the chemist, and should never be adopted as a basis in important cases, it may, however, very well serve the purpose of persons unacquainted with chemistry, (ordinary merchants and manufacturers,) on account of its great facility of execution.

Moreover, the circumstance already mentioned—that, on the one hand, this process cannot pretend to accuracy, and that, on the other hand, it requires a long time for its execution, (which appears to be an inconvenience for ordinary use, which requires the utmost speed)—this circumstance

I say induced me to pursue this subject still further, and with this view I had recourse to tartaric acid.

I expected to find, in the property which bitartrate of potassa possesses, of dissolving only with considerable difficulty in water, the most convenient means for founding a process of testing potassa, on the employment of this acid; for it must be foreseen, that if to a sample of potassa containing soda, be added the proportion of tartaric acid precisely necessary for converting the two alkalis into bicarbonates, the bitartrate of soda, in presence of a sufficient quantity of the solvent, should remain in solution on account of its greater solubility, and the bitartrate of potassa should be precipitated, under the form of a crystalline powder, either in greater part or entirely, when all the liquors employed have been previously saturated with bitartrate of potassa at the ordinary temperature: this deposit might then easily be measured.

In order to make a trial of this theoretical supposition, it was necessary first to solve the following question—“*How much bitartrate of soda is dissolved in a solution of bitartrate of potassa, at the ordinary tempera'ure?*”

In order to solve this question, I put into 240 grains of a solution of bitartrate of potassa, completely saturated at the ordinary temperature, crystallised bitartrate of soda, until the last portion added remained undissolved, after the mixture had been well stirred—13.6 grains of bitartrate of soda were dissolved. Consequently, 100 parts of concentrated solution of bitartrate of potassa dissolve 5.6 parts of bitartrate of soda, or, to dissolve 1 part of the latter salt, 17.8 parts of the saturated solution of the bitartrate of potassa are required. If, therefore, 100 grains, for example, of anhydrous carbonate of soda be converted into 358.1 of bitartrate of soda, by the necessary quantity of tartaric acid, 6,394 grains of solution of bitartrate of potassa, completely saturated, at the ordinary temperature, are required for holding in solution the bitartrate of soda formed.

The circumstance should furnish one of the bases for the process to be followed ; for the other, it was necessary to find the space which would be occupied by the quantity of bitartrate of potassa which might be formed by 100 grains of perfectly pure simple carbonate of potassa.

In order to solve this question, after some preliminary investigations, of which it is useless to speak, I took a glass tube, of as equal a diameter as possible, and of equal thickness throughout—about three feet in length, and five lines in diameter—and I closed it at one of its extremities

I then put into this tube a solution of bitartrate of potassa which had been prepared in the following manner:—I poured into a small glass matrass, capable of being corked, on one-fourth of the quantity of bitartrate of potassa, which 100 grains of pure carbonate of potassa can furnish, that is to say on 68.2 grains about two ounces and a quarter of solution of bitartrate of potassa saturated at the ordinary temperature ; I well corked it, and heated it cautiously, in order to effect the complete solution of the bitartrate of potassa.

The warm and perfectly clear solution was then promptly poured into the above-mentioned tube ; the matrass was washed with a smaller quantity of solution of bitartrate of potassa, saturated cold : I well corked and agitated, until the temperature of the tube and its contents was completely reduced to that of the surrounding atmosphere, or rather to that of the solution of bitartrate of potassa, at the commencement of the experiment. I plunged the tubes several times into cold water, in order to accelerate cooling.

The crystalline powder thus separated, whose quantity, as may readily be conceived, should correspond to 25 grains of potassa, was collected in the smallest possible space by striking the tube several times on a hard body, and when new blows did not heap it up, I made a mark with a file on the tube at the level obtained by the crystalline powder of bitartrate of potassa. The space below the mark was

then divided into 25 equal parts; then I continued to graduate the tube towards the upper part, until I had marked 100 parts and I added the numbers, ascending from 6 to 5, from the lower parts towards the upper. I afterwards broke the tube at about two inches above the place marking 100, and I united with the lamp the acute angles.

This tube, thus prepared, was tried in several ways, until I was perfectly convinced that each part exactly answered to one grain of pure carbonate of potassa.

This tube then served as a standard instrument for testing a suspected sample of potassa: for this purpose we proceed in the manner I am about to describe.

Two portions, of 100 grains each, of the potassa to be examined, are weighed out. The first 100 grains are tested by the ordinary process of alkalimetry; the quantity of test-acid employed in the Table, No. I., is ascertained, and the corresponding quantity of carbonate of potassa is noted; then the second 100 grains are dissolved in 8 or 10 times their weight of the solution of bitartrate of potassa, completely saturated at the ordinary temperature, and of which a very large quantity should always be kept in reserve. The solution is filtered in a flask capable of containing about one pound of water, and the filter is washed with the saturated solution of bitartrate of potassa. Then a quantity of tartaric acid, in fine powder, is added, equal to that indicated by the adjoining Table, (No. II.,) that is to say, the quantity necessary to convert into bitartrate all the alkali which is found in the potassa (potassa or soda, or both at once, carbonated or caustic.) This done, a sufficient quantity of the same solution of bitartrate of potassa at a known temperature is poured into the flask, so that its whole quantity may amount to about 6,400 grains. A slight excess or deficiency is generally without inconvenience. In order not to be obliged to weigh every time, the height obtained by the liquor may be marked with a file.

The flask is then corked, put in a warm place, and care-

fully stirred. It is not at all necessary that the bitartrate of potassa ready formed should then be completely dissolved, because it does not prevent the alkali from being converted into bitartrate, and changed into a fine crystalline powder; but in order that afterwards the precipitation of the powder of bitartrate of potassa may take place in a very uniform manner, and allow of as concordant a measuring as possible, it is better to heat and agitate the corked flask until the solution is complete; but, as I have already said, this care may be very well neglected, without fear of committing any essential error. The heated and still corked flask must be cooled as speedily as possible, by plunging it into water, or snow in winter, and stirring it briskly. It is as well, then, in order to obtain a crystalline powder of a very equal grain, to reduce the temperature of the flask and its contents below that of the surrounding atmosphere; but in that case, it is necessary to restore their temperature to the same degree as that of the solution of bitartrate of potassa, saturated cold, before the experiment: this is easily done. The cork of the flask is then replaced by another, in which is securely fixed the open extremity of the measuring tube. However, it is necessary that neither the tube nor the cork descend into the neck of the flask more than is necessary, for the cork to be hermetically adapted to the sides of the neck, in order that, when the flask is inverted, it may not deposit crystalline powder between the cork and neck of the flask. The flask is then inverted, and, by shaking it, all the powder of bitartrate of potassa is made to fall into the tube; then the flask is withdrawn; it is then no longer necessary to take account of its contents for the test, (and the tube is struck on a solid body until the crystalline powder is collected into the smallest possible space,) and we may then, without any other operation, read on the scale the number of hundredths of pure carbonate of potassa contained in the potassa examined.

After having ascertained in the manner described, the

quantity of pure carbonate of potassa which is found in the potassa examined, we seek for the difference which exists between the parts of the test acid employed in the alkalimeter, and the hundredths of carbonate of potassa found in the measuring tube, and this number sought in the Table (No. III.) then indicates, without any other calculation, the proportion of hundredths of soda with which the potassa examined was adulterated.

Let us suppose, for example, that 100 grains of a sample of potassa had employed for their neutralisation 60 degrees of test acid, the quantity of carbonate of potassa which corresponds to them must be sought for in the table, No. I. The number in question is 87.5. Now, if 100 grains of the same potassa gave likewise 87.5 of crystalline powder in the measuring tube, there would be no difference between the two numbers found, and it must be concluded that the potassa in question was not adulterated with soda.

If, in another experiment, the quantity of carbonate of potassa found by the alkalimeter was 52, and if my measuring tube indicated only 32, it would be necessary to subtract this latter number (which represents the hundredths of pure carbonate of potassa really contained in the potassa) from the first, namely, 52, and to seek the difference (20 in this case) in Table III. in order to find the number of hundredths of soda with which the potassa examined is adulterated: this would be 22.5 hundredths in the present case. The 25.5 hundredths which are still wanting should then be attributed to the ordinary and accidental impurities of potassa.

If a saline mass sold for potassa, gave by the alkalimeter 80 degrees, and if there were not formed, on the contrary, any crystalline powder in the measuring tube, the salt in question would be only carbonate of soda, with 10 per cent. of other impurities; for the number found of alkalimetric degrees would immediately indicate the difference sought for, since, in the latter case, there would be nothing to be subtracted.

We may here remark, in conclusion, that this process, which has fully satisfied me, may also be simplified by using an alkalimeter with a solution of tartaric acid, saturated with bitartrate of potassa, instead of test-acid, and dividing the alkalimeter in such a manner, that each degree shall answer to one grain of pure carbonate of potassa; for, in this case, it is sufficient to neutralize the 100 grains of potassa submitted to examination, to note the quantity of test-acid employed; to add, also, an equal quantity of test-acid, as has been indicated above, and the difference between the carbonate of potassa, indicated by the alkalimeter and in the tube, will give, by aid of Table III., the measure of the adulteration.

TABLE 1.

The following degrees of the Alkalimeter:—	Answer to the follow- ing quantities of Car- bonate of Potassa.	The following degrees of the Alkalimeter:—	Answer to the follow- ing quantities of Car- bonate of Potassa.
1	1.45	46	67.08
2	2.91	47	68.54
3	4.37	48	70.00
4	5.83	49	71.45
5	7.39	50	72.91
6	8.74	51	74.37
7	10.20	52	75.83
8	11.66	53	77.29
9	13.12	54	78.75
10	14.58	55	80.20
11	16.04	56	81.66
12	17.50	57	83.12
13	18.95	58	84.58
14	20.41	59	86.04
15	21.87	60	87.50
16	23.33	61	88.95
17	24.79	62	90.41
18	26.24	63	91.87
19	27.70	64	93.33
20	29.16	65	94.79
21	30.62	66	96.25
22	32.08	67	97.70
23	33.54	68	99.16
24	35.00	69	100.62
25	36.45	70	102.08
26	37.91	71	103.54
27	39.37	72	105.00
28	40.83	73	106.45
29	42.29	74	107.91
30	43.75	75	109.37
31	45.20	76	110.83
32	46.66	77	112.29
33	48.12	78	113.75
34	49.58	79	115.20
35	51.04	80	116.66
36	52.50	81	118.12
37	53.95	82	119.58
38	55.41	83	121.04
39	56.87	84	122.50
40	58.33	85	123.95
41	59.79	86	125.41
42	61.25	87	126.87
43	62.70	88	128.33
44	64.16	89	129.79
45	65.62		0

TABLE II.

To a Potassa which marks the following degrees of the Alkalimeter--	Must be added the following quantity of tartaric acid:--	To a Potassa which marks the following degrees of the Alkalimeter--	Must be added the following quantity of tartaric acid:--
1	3.19	46	147.07
2	6.39	47	150.27
3	9.59	48	153.47
4	12.78	49	150.67
5	15.98	50	159.86
6	19.18	51	163.06
7	22.38	52	166.26
8	25.57	53	169.46
9	28.77	54	172.65
10	31.97	55	175.85
11	35.17	56	179.05
12	38.36	57	182.25
13	41.56	58	185.44
14	44.76	59	188.64
15	47.96	60	191.84
16	51.15	61	195.03
17	54.35	62	198.23
18	57.55	63	201.43
19	60.75	64	204.63
20	63.94	65	207.83
21	67.44	66	211.02
22	70.34	67	214.22
23	73.53	68	217.42
24	76.73	69	220.61
25	79.93	70	223.81
26	83.13	71	227.01
27	86.32	72	230.21
28	89.92	73	233.60
29	92.72	74	236.40
30	95.92	75	239.80
31	99.11	76	243.00
32	102.31	77	246.19
33	105.51	78	249.39
34	108.71	79	252.59
35	111.90	80	255.79
36	115.10	81	258.98
37	118.30	82	262.18
38	121.50	83	265.38
39	124.69	84	268.57
40	127.89	85	271.77
41	131.09	86	274.97
42	134.28	87	278.17
43	137.48	88	281.36
44	140.68	89	284.56
45	143.38		

TABLE III.

If the difference is--	The Potassa tested is adulterated by the following quantities of Soda in hundredths.	If the difference is--	The Potassa tested is adulterated by the following quantities of Soda in hundredths.
1	1.125	46	51.75
2	2.25	47	52.87
3	3.37	48	54
4	4.50	49	55.12
5	5.6	50	56.25
6	6.75	51	57.37
7	7.87	52	58.5
8	9	53	59.62
9	10.12	54	60.75
10	11.25	55	61.87
11	12.375	56	63
12	13.50	57	64.12
13	14.62	58	65.25
14	15.75	59	66.37
15	16.87	60	67.5
16	18	61	68.62
17	19.12	62	69.75
18	20.25	63	70.87
19	21.37	64	72
20	22.50	65	73.12
21	23.62	66	74.25
22	24.75	67	75.37
23	25.87	68	76.50
24	27	69	77.62
25	28.125	70	78.75
26	29.25	71	79.87
27	30.37	72	81
28	31.5	73	82.12
29	32.62	74	83.25
30	33.75	75	84.37
31	34.87	76	85.50
32	36.0	77	86.62
33	37.125	78	87.75
34	38.25	79	88.87
35	39.37	80	90
36	40.50	81	91.12
37	41.62	82	92.25
38	42.75	83	93.37
39	43.87	84	94.50
40	45.12	85	95.62
41	46.12	86	96.75
42	47.25	87	97.87
43	48.37	88	99
44	49.50	89	101.12
45	50.62		

Ibid, from Repertorium fur die Pharmacie.

ART. XLIX.—MEMOIR ON ALCOHOLIC FERMENTS.

BY M. BOUCHARDAT.

THE author proposes, in this memoir, more especially to make known two kinds of alcoholic ferments, which he distinguishes from beer yeast, and to notice the principal characters of the alcoholic ferments whose existence he admits. The following table presents a summary of the characters of these three kinds of ferments:—

FERMENT OF BEER (*fermentum cerevisiæ*.*)

1. Globules sometimes perfectly round, but ordinarily ovoid. These globules are not flattened like those of the blood, but they have a very regular spheroidal form, like the albuminous globules of the brain. The diameter of these globules varied, in my observations, from $\frac{1}{91}$ to $\frac{1}{150}$ of a millimetre in diameter.

2. The greater number of the globules of beer-yeast are well isolated from one another; some, however, have on the side a smaller globule, which is not simply in juxtaposi-

FERMENT OF DREGS, (*fermentum fæcis*.)

1. Globules most frequently perfectly round; some, however, are ovoid; they are not flattened like those of the blood, but they have a very regular spheroidal form: they greatly resemble the albuminous globules of the brain. The diameter of these globules varies from $\frac{1}{214}$ to $\frac{1}{228}$.

2. Almost all the globules of dregs-yeast are isolated. Some, however, have on the side a smaller globule, which is not simply in juxtaposition, but which ap-

BLACK FERMENT, (*fermentum nigrum*.)

1. Globules perfectly round; they are not flattened like those of the blood. The dimensions of these globules vary from $\frac{1}{228}$ to $\frac{1}{50}$ of a millimetre.

2. All the globules of black yeast are isolated; when they are connected, or when they have on the side small globules annexed, they are transformed, and no

* I have adopted, as a generic name, the old word *fermentum*. I have not admitted the names of *mycoderma* and *torula*, proposed by M. Demaziere and Turpin, because they apply to a state of ferment in which this modified organized body has no action on a solution of sugar.

FERMENT OF BEER.

tion, but which appears to proceed from the large globule, and to be still dependant on it; some of the small globules are united to the large by a very evident elongation.

3. Color of the mass, uniformly whitish grey; each globule has granular contents.

4. Insoluble in pure water; insoluble in water containing $\frac{1}{1000}$ of hydrochloric acid; soluble in concentrated hydrochloric acid, which assumes a beautiful violet color. In great part soluble in water containing 0.001 of hydrochloric acid, after having been bruised for a long time with grains of silica.

5. Ether removes from it 0.05 of a liquid fatty body, containing oleine, stearine, and an oil which contains phosphorus among its elements.

6. Alcohol removes from it lactic and phosphoric acids, and extractive matters.

7. Composition:—Albuminous substances, but containing more oxygen, and containing, also, sulphur and phosphorus.

FERMENT OF DREGS.

appears to proceed from the large globule, and to be dependant on it.

3. Color of the mass, uniformly whitish-grey; each globule incloses lobulous contents.

4. *Idem*

5. *Idem*.

6. *Idem*.

7. *Idem*.

BLACK FERMENT.

longer act as alcoholic ferments.

3. Examined with the microscope, the globule presents a very distinct black circle. The color of the mass is uniformly blackish-grey.—No granular contents are distinguished in each globule.

4. *Idem*.

5. Ether removes from it 0.003 of a liquid fatty matter, containing oleine and stearine, and an oil containing phosphorus.

6. *Idem*.

7. *Idem*.

FERMENT OF BEER.	FERMENT OF DREGS.	BLACK FERMENT.
8. Essential properties : —Placed in a solution of sugar, at a temperature varying between 50° and 84° F., determines a brisk fermentation, which terminates in a few days, not being able to be exerted in liquors, containing much alcohol. Is destroyed in the act of brisk fermentation.	8. Placed in a solution of sugar, at a temperature of from 50° to 54° F., determines a slow fermentation, which is complete only after 3 or 4 months ; it acts in liquors containing 16 per cent. of alcohol. Is not sensibly destroyed in the act of slow fermentation.	8. Placed in a solution of sugar, at a temperature of from 50° to 54° F., determines a slow fermentation, which is complete only after 6 months ; it acts in liquors containing more than 17 per cent. of alcohol. Is not sensibly destroyed in the act of slow fermentation.
9. Collected in ordinary beer.	9. Collected in very strong beer.	9. Collected in a deposit of white wine.

The facts contained in this table, says M. Bouchardat, show that these alcoholic ferments differ from each other ; firstly, in form, color, and dimensions, and in the contents of the globules ; secondly, by the mode in which they decompose sugar ; thirdly, by the medium in which they exist.

I designate them by the names of *beer-yeast*, *dregs-yeast*, and *black yeast*.

Dregs-yeast and black yeast are especially remarkable, because, by aid of a slow fermentation, they can determine the formation of richer alcoholic liquors than most generous wines. In order to acquire information concerning the nature of ferments, I studied their proximate and elementary composition, and the action on these globules of water containing $\frac{1}{1000}$ of hydrochloric acid.

Proximate Composition of Alcoholic Ferments.

The following is a list of the substances which enter into the composition of ferments :—

1. Proteic animal matter, insoluble in alcohol, containing nitrogen, hydrogen, carbon, oxygen, sulphur, and phosphorus.

2. Nitrogenous matter, soluble in alcohol.
3. Solid fat.
4. Liquid phosphuretted fat.
5. Lactic acid, lactate of lime and soda.
6. Acid phosphate of lime, and acid phosphate of soda.

Elementary Composition.

The proteic animal substance, which forms the essential part of the ferment, differs from casein, albumen, and fibrin by an excess of oxygen, which is not less than 2 per cent.

Action of Hydrochloric Acid at 0.001.

Water containing $\frac{1}{1000}$ of hydrochloric acid dissolves with facility, as I have shown, albumen, casein, &c.; the alcoholic ferments completely resist this solvent action: they are partially dissolved in it when the globules are torn by pulverization: these experiments prove to us that the proteic matters of the globules of the ferment are constituted of two different substances: the one enclosed, soluble in acidulated water; the other enveloping, insoluble in that solvent.

I will describe an experiment which shows us the analogy of ferments with the globules of animals.

Action of the brain of an adult man on a solution of sugar.

I took 25 grammes of the brain of an adult man, and put it into a quart of water, and added to it 250 grammes of sugar. After 48 hours, the temperature being about 77° F., the alcoholic fermentation commenced, and continued to progress regularly.

At first sight, one would be tempted to perceive here only a fact analogous to those noticed by M. Colin. This chemist, indeed, proved that the albumen of the egg, and several other organic matters, might become alcoholic ferments. But this is the difference between M. Colin's re-

sults and mine: albumen, put in contact with a solution of sugar, at the temperature of 92° F., is converted into a ferment, whose action is very weak at the end of three weeks; whilst the cerebral mass of an adult acts, at the end of 48 hours, as an energetic alcoholic ferment.

The substance which composes the brain is formed by the union of globules of different kinds. Among these the most important are the albuminous globules, which present the microscopic appearance of the ferment of dregs, and which act like it on the solution of sugar; these globules are not constituted of pure albumen, as has hitherto been thought. Indeed, if we treat the cerebral mass of an adult with water acidulated with 0.001 of hydrochloric acid, this pretended albumen is not dissolved; to dissolve it, it is necessary previously to bruise it with silica. These experiments show us that the proteic globules of the brain are formed, like the globules of ferment, of an envelope insoluble in acidulated water, and of an enclosed albuminous matter, soluble in that vehicle.

If, instead of taking the cerebral mass of an adult animal, that of a newly-born animal be selected, if it be put into a solution of sugar, and if the mixture be exposed to a temperature of 77° F., alcoholic fermentation does not take place, but the mucous transformation is observed.

The reason of this difference is very simple. The envelopes of the brain of a young animal have not sufficient resistance, they are destroyed by endosmose in the solution of sugar, and, the globules no longer existing, alcoholic fermentation cannot take place.

Nature of the globules of alcoholic ferments.

The globules of alcoholic ferments present the most complete analogy with the nervous globules of superior animals. When, in definite conditions, these vegetables ramify and are transformed into vegetable infusoria, they lose their characters as ferments; the spores themselves of these new

vegetables do not possess the property of decomposing the solution of sugar.

Experiment on the development of the globules of alcoholic ferments.

I dissolved the whites of 4 eggs and 1 kilogramme of sugar in 4 quarts of water, containing 0.001 of hydrochloric acid. The liquors were filtered with the greatest care, and divided into two equal flasks. I added nothing to the first flask, and, after two months, the temperature varying from 59° to 77° F., alcoholic fermentation had not manifested itself. To the second flask I added an equally limpid solution of 10 grains of tannin in 100 grammes of water. An abundant precipitate was immediately formed, which, after 49 hours' exposure to a temperature of 77° F., was partly converted into globules of $\frac{1}{400}$ of a millimetre, acting absolutely with a solution of sugar like the ferment of *dregs*.

On the multiplication of the globules of ferment.

All chemists know, since the experiments of M. Thénard, that when a solution of sugar is fermented with a sufficient quantity of globules of ferment, when the first fermentation is accomplished, the weight of the globules is considerably diminished. After a second fermentation they almost entirely disappear, and are replaced by an ammoniacal salt which is found in the liquid, and by the remains of microscopic vegetables, in which M. Thénard recognized the existence of ligneous matter; but this observation can be invoked only to establish the non-production of the globules of the ferment. It may be said that these globules require two kinds of nourishment: sugar, to produce heat by its dédoublement, and nitrogenous matter, to furnish the elements adapted for their assimilation and reproduction. The following is the reply offered by experiment to this latter supposition:—

I took 1 kilogramme of sugar, 4 quarts of water, 50

grammes of yeast, and 200 grammes of white of egg dissolved in water by means of 0.001 of hydrochloric acid. The temperature being maintained at 68° F., the fermentation was promptly established, and continued to proceed with regularity for four days; being then slower, I collected the ferment, and I found its weight to be only 50 gr. .5. There is beyond that a multiplication of 1 to 7 observed in the brewer's vat. The globules of ferment cannot, in any way, assimilate the albuminous matter, any more than the sugar. On the other hand, I have repeated the above experiment by substituting for the 200 grs. of albumen 100 grs. of fresh gluten, also dissolved in water acidulated with 0.001 of hydrochloric acid. I employed also 50 grs. of yeast. The fermentation proceeded regularly for four days. The ferment collected at this time did not weigh more than 49 gr. .2. It is evident that the globules of the ferment do not assimilate more of the solution of sugar than the solutions of albumen and gluten. Does it not follow from these experiments that if we find in the brewer's vat 7 of ferment, only one having been put in; this must be owing only to this 1 part of ferment having met with proteic substances, which, placed in a fermenting medium, are proper for giving rise spontaneously to globules of ferment; the same as in the must of grape, without having added ferment, we find a considerable quantity of it?

Ibid, from Comptes Rendus.

ART. L.—ON SAGAPENUM AND ELEMI. By A. J. COOLEY.

Sagapenum.

This substance is described in the London Pharmacopœia as a gum resin, the production of an uncertain species of ferula. Willdenow, Sprengel, and Fée considered it to be the produce of the *Ferula persica*, but this opinion appears to be unsupported by any direct evidence, (Pereira,) and up to the present time, the question is quite as unanswerable as it was 2,000 years ago. What renders this ignorance the more singular is the fact that sagapenum is not a medicine of yesterday, but was known to antiquity. Hippocrates, who died B. C. 361, as well as Dioscorides, mention this substance; and the latter even asserts that it is the liquid produce of a ferula growing in Media. Pliny, the Roman naturalist, also mentioned "SACOPENIUM" nearly 1,800 years ago.

The sagapenum of commerce is either met with under the form of agglutinated tears of a yellowish-brown color, or in tough irregular masses. It possesses an odor and appearance intermediate between assafœtida and galbanum. When heated it evolves a peculiar smell, partaking of garlic and juniper, which is neither so powerful nor disagreeable as that of the fetid gum. According to the analyses of Pelletier and Brandes, it consists of:—

	Pelletier.	Brandes.
Resin, soluble in alcohol, and partly soluble		
in ether, - - - - -	54.26	50.29
Gum, - - - - -	31.94	
Do. with calcareous salts, - - - - -		32.72
Volatile oil, of a yellow color, lighter than		
water, smelling strongly of assafœtida, and		
soluble in ether and alcohol, - - - - -	7.20	3.73
Bassorin, - - - - -	1.00	4.48
Malate of lime, - - - - -	} 1.00	1.12
Phosphate of do., &c. - - - - -		
Loss, (water,) - - - - -	4.60	4.60
Foreign matter, - - - - -		4.30
	<hr/> 100.00	<hr/> 101.24

This gum is only employed in three preparations to my knowledge, and those are, the pilulæ sagapeni co., the pilulæ galbani co., and the conserva rutæ, or confectio rutæ, of the London and Dublin Pharmacopœias. It is seldom administered alone, but when it is, the dose varies from 5 grains to half a drachm. In the first of the above preparations, it forms $\frac{16}{17}$ ths of the dry ingredients, in the pil. galbani co. (P. L.) $\frac{1}{3}$, and in the confectio rutæ $\frac{2}{21}$. It is therefore evident that the attention of the dispenser should be directed to the purity of a medicine administered in such large quantities. It is a painful fact, however, that the mass of the sagapenum sold to the retail trader is factitious, and formed by mixing together assafœtida, galbanum, and other drugs in variable proportions. This is generally done by the conscientious druggists, by softening a mixture of 3 parts of assafœtida and fourteen parts of galbanum, in a water or steam-bath, and then stirring in about $\frac{1}{17}$ th of their weight of turpentine, to which a little oil of juniper has been added. This mixture is called "gummi sagapeni OPT.," an inferior sort being made by adding sundry portions of yellow resin and paste of gum tragacanth to the above. So much for the honesty of men who, for the sake of a small additional profit, at once trifle with the health and pick the pockets of those who confide in them. It is a painful fact, but too true and too palpable to be denied, that much of the skill and exertions of the faculty are neutralized by the inferior quality of the drugs and preparations which are employed in dispensing their prescriptions. Much of this arises from the cupidity of the retailer inducing him to purchase the lowest priced articles offered him for sale; but a still more fertile cause is his total inability to discriminate one quality from another. The ease with which inferior and often spurious drugs are sold for those of good quality has so encouraged the practice among some unprincipled traders, that they do it with the utmost carelessness, and apparently without the fear of detection. The only *certain*

remedy against such conduct is the ability to examine and test the quality of drugs and chemicals, and the unflinching use of this valuable qualification before every purchase.

Elemi.

This resin, like sagapenum, is the produce of an unascertained tree, respecting which there have been various conjectures. The London and Dublin Colleges assign it to the *Amyris elemifera*, but the Edinburgh College, with greater discretion, state it to be the "concrete resinous exudation from one or more unascertained plants." Dr. Pereira has suggested that it may be the produce of the *Icica icicaribo*, the *Canarium zephyrinum*, or the *Canarium balsamiferum*, but the question is still undecided.

The elemi of commerce is of a pale yellow color, exteriorly brittle, but soft and tough within; it has a warm bitter taste, and a fragrant aromatic smell, partaking of fennel and juniper. It is only partially transparent, even in thin plates, is very fusible, and has a density a little greater than that of water. According to Bonastre, it consists of 84 per cent. of resin, 12.15 of a fragrant volatile oil, and a little bitter extractive. In medicine it is only employed in the preparation of the unguentum elemi, (P. L.) This substance, like sagapenum, is sometimes adulterated, but more frequently a factitious kind is sold in its place. The latter is formed by adding 1 part of balsam of Canada to 4 parts of yellow resin, previously melted, after which about $1\frac{1}{2}$ per cent. of oil of juniper, and half this quantity of oil of fennel are stirred in. This fraud is readily detected by exposing the suspected article to heat, along with a little water, when its fragrance will evaporate, and the coarse terebinthinate smell and taste of the resin may be readily detected.

Ibid.

MISCELLANY.

On Potatloe Oil and the purification of Brandy.—BY PROFESSOR DOBEREINER.—It is known that brandy of potatoes, infected with the disagreeable taste to which the name of *fusel* has been given, is much ameliorated, with respect to both taste and odor, when mixed with one-tenth part of its bulk of vinegar and a little sulphuric acid, and distilled after several days.

It was formerly, and still is, believed, that by this process a little acetic ether (acetate of oxide of ethule) is formed, and that this is the cause of the improvement of the brandy. This is an error, for very little or no acetic ether is formed, but, indeed, acetate of oxide of amylol, which has so agreeable a taste and odor of fruit, that it may be employed for perfuming apartments and for the preparation of ratafias of fruits? The readiness with which oxide of amylol combines with acetic acid, is infinitely more considerable than that which oxide of ethule exerts, and does not require, like the latter, the aid of a mineral acid.

The action of chloride of lime on the brandy of fusel, which I discovered more than 36 years ago, has no other origin, since the hydrated oxide of amylol or potatoe oil is metamorphosed by the salt, and thus converted into an ethereal substance of an agreeable taste.

Perfectly calcined wood and animal charcoals separate the potatoe oil completely, in brandy which contains it, only when the liquid has been previously diluted with water, by means of which the force with which the alcohol contains this oil in solution is diminished. In rather concentrated brandy, or alcohol, this oil cannot be separated by any kind of charcoal.

The most simple mode of removing the fusel from brandy, consists in rectifying it in Pistor's disinfecting apparatus. The oil of fusel is thus collected, as a secondary product, in such large quantities that it may be used for the purpose of illumination, on account of its brilliant flame, or for other uses in the arts. I received some time ago several quarts of this oil, from an establishment for the disinfection of of brandy at Magdeburg, and I have been enabled to study its properties, principally with relation to the purification of the brandy of

potatoes; the results which I obtained are those above alluded to, and I have also completely convinced myself of the correctness of the opinions of MM. Cahours and Dumas, who regard the fusel of potatoe brandy as analogous to alcohol and pyroxylic spirit.

I will call this oil, on account of this analogy, *amylo*, and will only remark that it acts with finely divided platinum in the same manner as spirit of wine and pyroxylic spirit: thus, when it is put in contact with these liquids, in presence of atmospheric air or oxygen, it absorbs four atoms of this gas, and forms one atom of valerianic acid and three atoms of water.

In a German vinegar manufactory, I remarked, some time ago, a very evident odor of valerianic acid, and I very soon discovered that, for the preparation of vinegar, potatoe brandy, which had not been disinfected, was used. It would certainly be interesting to ascertain whether, in the vinegar-mother liquors, there is not alcohol alone, but, also, potatoe oil or amylo, which might be oxygenised, and whether we might not find, in commerce, vinegars made from alcohol containing valerianic acid. It appears probable that pyroxylic spirit, diluted with much water, might be oxidised in these apparatus and converted into formic acid; it is an experiment which I recommend to those who are in a position to make it.—*London Chemist*.

New Method of detecting the Presence of Sugar in Diabetic Urine. By DR. CAPPEZUOLI.—This author does not use the blue solution adopted by Frommehers and Taddei (a compound of albumen, potash and oxide of copper), but a few grains of hydrated oxide of copper and a solution of caustic potash in sufficient quantity to render the liquid distinctly alkaline. The operation takes place at ordinary temperatures. The urine is obtained fresh, placed in a cylindrical vessel, either conical or straight, the copper and potash then added, the mixture shaken, and then laid aside. It becomes troubled from the precipitation of the phosphates which were dissolved in it, and from the oxide of copper which it contains in suspension. It gradually however becomes clear, in consequence of the subsidence of a voluminous deposit, which is at first of a sky-blue colour, but at the end of a few hours a canary-yellow circle is perceived to form upon its surface, and usually to pervade the whole mass; subsequently a red colour, more or less deep, in the form of a zone, replaces the yellow, either wholly or in part. This phenomenon, which takes place in 24 hours, is owing to the reaction of the sugar on the oxide of copper. In fact, this base is gradually deprived of its oxygen until the metal is reduced. The sugar, by absorbing oxygen, is transformed principally into formic acid, which combines with the potash. The reac-

tion is rapid when grape-sugar is used, such as that of diabetes. The yellow zone, and the red one which succeeds it, are true characteristics of the presence of sugar in diabetic urine; for they are not produced in the normal state, nor in any other diseased condition of the urine. It might be feared that the presence of sugar of milk in certain urines, might cause the same appearances, because, as is well known, it approaches very nearly to grape-sugar; but such does not occur save when the milk-sugar is in very considerable quantity, and then it requires a much longer time. The same holds good with urines containing the volatile oils of turpentine, copaiba, &c. The author, in acting upon urines to which an addition of honey or grape-sugar has been made, has constantly obtained the red zone, nearly always preceded by the canary-yellow colour. The rapidity with which the reaction occurs, and the brightness of the tints, depend either on the more or less complex composition of the urine or excess of potash or sugar. Moreover, when the phenomenon is not produced within 24 hours, the addition of a little potash causes it to appear.—*Journ. de Pharm., from Gaz. Toscane.*

Pills of Extract of Aloes.—Extract of aloes readily absorbs moisture from the atmosphere, which renders it difficult to preserve in the form of pills. This inconvenience may be perfectly avoided, according to Mr. Röttcher, by adding a fourth part of carbonate of magnesia.—*The Chemist, from Archiv. der Pharm.*

Precipitation of Morphia from Tincture of Opium by Ammonia.—As is well known, tincture of opium and *Liq. Ammonia anisatus* are frequently prescribed in combination. M. Reinsch observed, that such a mixture after standing twenty-four hours, deposited morphia in the crystalline form; this may be prevented by the addition of alcohol.—*Ibid, from Jahrb. für Prakt. Chem.*

[The carbonate of the aromatic spirit of ammonia, which is more frequently ordered in this country, produces the same decomposition.—*Ed. Chem. Gaz.*]

Extractum Turaxaci.—Dr. Bley, who has made some comparative experiments on this extract, states that he obtained in the spring, from 32 lbs. of fresh root with green parts, by pressure 10 oz., by infusion 18 oz., by decoction 19 oz. of extract; in autumn, from fresh roots with the green parts, by infusion 37 oz.; and from 13 1-2 lbs. of dry roots (equal to 40 lbs. of fresh,) by infusion 38 oz. of extract. The extracts

prepared in the spring were all brown, of the peculiar odour and bitter saline taste; the extracts prepared in the autumn were, on the contrary yellowish-brown, and possessed a sweetish odour and taste. On solution in water, the extracts prepared in spring deposited much less inuline than those made in autumn. The extract obtained by pressure is most active, but it is also the dearest; the infusion, over which the decoction has no advantage, is preferred. Perhaps it would be best first to express the plant, then to infuse the residue in a little hot water for a few hours, to express again and proceed as usual.—*Ibid*, from *Archiv der Pharm.*

Heusler's Charta Vesicatoria.—Yellow wax, ℥iiss; oil of cantharides, ℥j; spermaceti, ℥vj; larch turpentine, ℥ij, are melted together, and the mass when nearly cold is spread upon paper with a spatula. The following plaster, likewise spread on paper, is recommended for confining it to the intended place:—Lead plaster, ℥vj; purified rosin, yellow wax, olive oil, of each ℥ij; turpentine, ℥v. Mix.—*The Chemist, Jahrb. für Prakt. Pharm.*

Observations on Balsam, Copaiva. By. J. E. SIMON.—The genuineness of copaiva balsam is frequently tested by mixing 3 parts of balsam with one of caustic ammonia of 0.96 spec. grav. If the mixture is rendered clear by shaking, the balsam is usually considered genuine. If to this balsam the sixth part of oil of juniper-wood be added, it behaves towards ammonia precisely like the genuine, likewise affording a clear combination, which proves the insufficiency of this test.

Of late there has frequently occurred in commerce a balsam which will not bear the above test with ammonia. I have taken much trouble to detect any adulteration in this balsam, but am thoroughly convinced that it is perfectly genuine. It contains from 20 to 25 per cent. more essential oil, which renders it more liquid, but the oils from both kinds of balsam are identical in odour and in all other properties; the residuous resin in both kinds becomes equally hard and brittle, which entirely does away with the supposition of its having been adulterated with any fat oil. The two resins however differ, the one affording a soapy combination with caustic alkalies, which the resin of the new balsam does not.

Whether this new balsam is obtained from younger trees, or whether it is derived from a different species; whether the one is more active than the other, it is impossible for me to say; but the latter is decidedly not adulterated, for on boiling with water not the least foreign odour is perceptible, and the residue, after boiling and driving off the volatile oil, is hard and brittle like sealing wax.—*Chem. from Archiv. der Pharm.*

Analysis of Galls. By GUIBOURT.—Galls contain, according to the author, the following constituents which pre-exist in them :—

Water, 11.5; woody fibre, 10.5; tannine, 65; gallic acid, 2. Ellagic acid and luteo-gallic acid, 2. Brown extractive substance, 2.5. Gum, 2.5. Starch, 2. Chlorophylle and volatile oil, 0.7; sugar, 1.3; albumen and salts.

The author assigns the name of luteo-gallic acid to the yellow colouring principle of the galls. It may be separated from ellagic acid by dissolving the two in potash and exposing the solution to the atmosphere; ellagate of potash is deposited in proportion as carbonic acid is absorbed from the air, while the luteo-gallate of potash remains in solution.—*Ibid*, from *Ann. der Chem. und Pharm.*

Decomposition of the Golden Sulphuret of Antimony by Light.—M. Ingenohl has observed, that carefully prepared golden sulphuret, which has been quickly dried in a shady place, keeps for a long time in dark vessels undecomposed, but becomes paler when exposed to light, and then yields on analysis an amount of oxide of antimony and sulphuric acid. Wackenroder confirms this observation, and likewise that of Otto, that the precipitated golden sulphuret always contains an amount of oxide when dried by exposure to the air. The preparation precipitated from the sulphuret of antimony and sodium does not undergo so remarkable a decomposition by light.—*Ibid*, from *Ibid*.

On the occurrence of Mannite in the Laminaria saccharina, and other sea weeds. By JOHN STENHOUSE, Ph.D.—After reviewing the experiments and published reports of various authors, Dr. Stenhouse proceeds to detail the examination of a great variety of sea-weeds; out of eight different species examined, mannite was separated, and in the case of the *Laminaria saccharina* amounting to 12.15 per cent. The method of separation consisted in digesting the dried extract by hot water, with boiling alcohol, and allowing the mannite to crystallize out by cooling; as thus obtained its composition was $C^6 H^7 O^8$. Mannite may be distinguished from cane-sugar by its not being discoloured from the action of strong sulphuric acid and a gentle heat; and from grape-sugar by boiling with strong solution of caustic potash or soda, the mannite dissolving without change of colour. When heated with solution of potash and sulphate of copper, it does not precipitate the red oxide of copper, as is the case with grape-sugar.

Dr. Stenhouse could not detect mannite in the Couch-grass, as stated by Prof. Pfaff, but obtained crystals of binoxalate of potash, which appear to have been mistaken for the former substance.—*Chem. Gaz.*

Antiperiodic Ointment.

R—Lard, - - - - -	95 gr.
Sulphate of quinine, - - - -	15 gr.
Sesquioxide of iron, - - - -	60 centi-gr.
Pure opium, - - - - -	15 “

USE.—In frictions on the vertebral region, after having washed it with soap and water, every two hours for three days.

This ointment is employed in cases of periodic fevers—when children are indisposed for absorption—when the fits do not allow time for administering the preparations of quinine—when there is vomiting and dysphagia, &c.—*Chemist from Journal de Chimie Médicale.*

Arsenic in the Earth of Cemeteries.—M: OLLIVIER D'ANGERS made the following communication to the Academy:—He had recently been engaged in a judicial inquiry which had involved an important medico-legal question, one on which M. Orfila had read a paper to the academy two years ago, viz., “the arsenic contained in the earth of cemeteries.” M. Orfila stated in his memoir that arsenic being insoluble in water, it was impossible that a body buried in arsenical ground could become impregnated by that substance. This statement, the result of theory, had been confirmed by the case to which he alluded, and which was as follows:—A man lost his wife, and public rumor having accused him of poisoning her, the body was exhumed. An accurate analysis, however, proved that she had died of organic lesions quite independent of the action of any poison. A married woman, who wished to marry this man, poisoned her husband, and on the *post mortem* examination being made, evident traces of arsenic were found. The woman was brought before the azzises, but owing to discussions between the medical witnesses, the trial was deferred to the ensuing session. The body of the poisoned man was again exhumed, and the viscera sent to Paris to M. Ollivier d'Angers, along with some of the earth of the grave. Arsenic was found in the liver through the means of Marsh's apparatus. It was also found in the earth. The authorities then had the body of the woman who first died again exhumed. It is worthy of remark that after the first exhumation the body accidentally fell out of the coffin into the grave, and was covered by arsenical earth. Not a trace of arsenic however was found in the body, although it had thus remained several months imbedded in arsenical earth. This case, therefore, confirms the previsions of M. Orfila. It shows both that arsenic does exist in the earth in some localities, and that this circumstance does not render medico-legal researches more difficult, as the insolubility of the arsenic contained in the earth of cemeteries prevents bodies becoming impregnated with it.

On M. Roux asking what was the cause of the presence of arsenic in cemeteries, M. Ollivier referred him to M. Chevalier, who had written an important memoir on the subject.

M. Chevalier stated that in the department of the Vosges, where the fact mentioned by M. Ollivier had occurred, there are many mines of arsenic. The presence of arsenic in the ground of the cemetery is, therefore, to be attributed, probably, to the geological constitution of the soil. This is not the case with the ground of the Parisian cemeteries. A fact with which he had only recently become acquainted, confirmed M. Orfila's views. All the bones of the work-people of a small town in which copper is wrought, found in the cemetery, contain copper; but copper is also found in the ground in which they lie. In order to ascertain whether the copper was primitively contained in the bones, or whether it was communicated from the soil, he sent for bones from other localities where copper is wrought, but where the earth does not contain that metal; he found that they were likewise impregnated with the metal.

M. Orfila recalled to the recollection of the Academy that in his memoir he had proposed two questions: first—Can a body impart to the earth the arsenic it contains? Secondly—Can earth, containing arsenic, poison, as it were, a body? The first question he then answered affirmatively, the second negatively. The fact related by M. Ollivier d'Angers proved that the results at which he had arrived were correct.—*Chemist.*

Formulæ for some Trochisci. By M. SCHMITZ.

Trochisci Althææ.—R Rad. Alth. Pulv. ℥ij.; Rad. Glycyrrhiz. ℥ss.; Rad. Iridis ℥j.; Sacch. Albi. ℥bij.; Mucil. Tragac. q. s.

Trochisci Bechici (according to Vignier.)—R Succ. Glycyrrh. Pulv. ℥xx.; P. Gum. Acaciæ ℥v.; P. Sacch. Alb. ℥xx.; Opii pulver. gr. lxxxiv.

Mix with about 10 oz. of water to form a mass, from 6 drms. of which thirty lozenges are to be made.

Trochisci Catechu.—R P. Catechu ℥vij.; Rad. Iridis ℥ij.; P. Sacch. Alb. ℥iij.; Ol. Rosar. ℥iv.; Mucil. Tragac. q. s.

Either 2-grain pills or small lozenges are to be made from this, and sprinkled with powdered violet-root. The oil of roses may be replaced by oil of cloves, cinnamon or peppermint.

Trochisci Gummi.—R P. Acaciæ Gum. Sacch. Albi aa, ℥iv.; Aq. Rosæ ℥ix.

The latter may be replaced by 4 drops of oil of roses and water, or by orange-flower water. It is best not to mix up more of this than the quantity stated, because the gum very quickly becomes dry.

Trochisci Ipecacuanhæ.—R P. Rad. Ipec. ℥x.; Sacch. Alb. ℥xxiv.; P. Catechu ℥ss.; Mucil. Tragac. q. s.

An ounce of these lozenges contains 30 grs. of Ipecacuanha, and each one weighing 5 grs. $\frac{1}{4}$ gr. of the root.

Trochisci Rhei.—R P. Rhei ℥ss.; Sacch. Alb. ℥vss.; Ol. Menth. Pip. ℥xij.; Aq. Menthæ Pip. q. s.

Trochisci Strumales.—R Sacch. gross. pulv. ℥xxx.; Aq. Rosæ ℥iv.; ad consist. Trochiscor. coque, et ab igne remove, dein adde pulv. sequent. ℥ij. + ℥vj. :—

R Spongix ustæ ℥iv.; Oss. Sepiæ, Lapid. Spongiæ aa ℥ij.; Nuc. Gallar., Cinnam. ft. ℥j.; M. P. Pulv. subtiliss. Fiant Trochisci secund. artem.

Trochiscia Vichy.—R P. Sodæ Bicarb. ℥xvj.; Sacch. Albiss. ℥xvj.; Mucil. e Tragac. pulv. ℥ss.; Aq. Comm. ℥xj. ut ft. Trochisci.

The most various recipes exist for these lozenges. The above is said to have been deduced from the analysis of true *Tablettes de Vichy*. They are rendered aromatic by the addition of balsam of Tolu, oil of peppermint, (gtt. vi.) and mixing with orange-flower water.

Trochisci effervescentes.—

Troch. Acidi.

R P. Acid. Citric. ℥iv.

Sacch. Albi. ℥viiij.

Ol. Citr. ℥xij.

Mucil. Trag. q. s.

Troch. Alkalini.

R P. Sodæ Bicarb. ℥iv.

Sacch. Albi. ℥viiij.

Muc. Trag. q. s.

The acid lozenges become moist, and must therefore be preserved in stoppered bottles.

Trochisci Cinchonæ.—R Extr. Cinch. flav. ℥iv.; P. Cort. Cinch. ℥viiij.; P. Sacch, Alb. lbj.; Aq. fount. ℥vj.—*Chem. Gaz., from Archiv. der Pharm.*

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ART. LI.—ON KALMIA LATIFOLIA. By R. H. STABLER, M.D.

Nat. Ord. ERICEÆ.

Sex. Syst. DECANDRIA *Monogynia*.

KALMIA Calyx five-parted. Corolla salver-form; border on the under side, producing ten cornute protuberances and as many cavities, in which the anthers are concealed.

Capsule five-celled, many-seeded; dissepiments margined.—*Beck*.

K. latifolia. Leaves on long petioles, scattered and ternate, oval, coriaceous, green on both sides; corymb terminal, viscidly pubescent.

Beck's Medical Jurisprudence, Vol. 2, p. 550, 673. Barton's Materia Medica, part 1, p. 18. Bigelow's Med. Botany, Vol. 1, p. 137, 139.

Common names. Laurel, Mountain Laurel, Broad-leaved Laurel, Bay, Calico Bush, Mountain Ivy.

Not officinal.

Description.—This is an indigenous shrub, having a root very irregularly branched, giving offsets immediately below the surface and shooting deep into the soil. The texture of both it and the stems, is very firm, and employed by the Indians in making various useful articles, such as spoons, trowels, &c. There are generally three principal stems to each plant. They are dichotomously branched, and vary in height from three to twenty feet; have a rough striated appearance imparted to them by the longitudinal splitting, and separation of the external layers of bark, and

a gray color. The leaves are on long petioles, scattered, ternate, oval and smooth on both sides. The flowers are arranged in terminal corymbs: the corolla wheel salverform, with ten horns beneath, and ten corresponding cavities within, containing the anthers until the pollen is mature. They are usually of a rose color, occasionally white. The calyx is five-parted, persistent, wheel form, and hypogynous. The stamens are ten in number, and inserted into the base of the corolla; anthers two-celled, the cells hard and dry. There is but one persistent style. The capsule is five-celled, five-valved, the valves alternating with the divisions of the calyx. Seed indefinite, minute, embryo cylindrical, in the axis of fleshy albumen, radical opposite the hilum.

Habitat.—This species of *Kalmia* is found throughout the United States, but is most abundant on hill sides and the banks of rivers and streams; it is also found in great abundance on the Alleghany mountains, which are rendered quite gay at the season of its flowering, by the large clusters of beautiful rose colored flowers contrasted with the rich green foliage. It begins to flower late in June, continuing in inflorescence about a month. The seeds do not ripen until late in the fall. Its handsome flowers and rich evergreen foliage, render it well worthy of cultivation as an ornamental plant. The most ready way of propagation, is by parting the roots late in the fall; if grown from the seed it does not flower until several years old. The situation best adapted to its habits is a shady border of light gravelly and rich soil.

Medical History.—The poisonous nature of the *Kalmia*, was probably familiar to the aborigenes, before we became acquainted with it. Dr. Barton says, a decoction of the leaves is used by the Delaware Indians, to poison themselves with. It is a prevailing opinion also, that sheep and cattle are occasionally poisoned by feeding on the leaves, but they are eaten with impunity by deer, goats and par-

tridges. The latter are considered poisonous, as food, during the winter and spring, from their feeding on the buds. The facts in support of this opinion are numerous, but the prescribed length of this article prohibits me from mentioning more than a few of them. Dr. Shoemaker, of Philadelphia, published in the North American Medical and Surgical Journal, two cases of poisoning occurring in the same family, from eating the flesh of partridges; the place where the bird was prepared for the spit, was examined and a number of the laurel leaves were found. This occurred in February, 1826. Dr. Mease has published several cases which occurred in the same city, during the years 1791 and 1792. Other cases are related by Dr. Hayward of Boston, and Dr. Comstock of Connecticut. It is well known that honey is occasionally poisonous, and, in our own country, the deleterious properties imparted to it, have been traced to the bees feeding on the flowers of this, and other poisonous plants, as the Andromeda, Agalea, Datura rhododendron, &c. Dr. Barton, states that a party of adventurers removed some hives of bees from Pennsylvania to New Jersey, in hopes that the savannas of the latter country might be favorable to their increase, and consequently to the making of honey; the Kalmia was the principal flowering plant in these situations; the bees increased prodigiously, but it was soon found that every one who ate of the honey became intoxicated in a high degree. He recommends that every fœtid or poisonous vegetable should be removed from the habitation of these insects. In two cases recorded by Dr. Hosack, the honey was of a dark reddish color, and thicker consistence than is usually sold in the markets.

Medical Properties.—The leaves, which constitute the part used in medicine, are possessed of poisonous properties, but have been used with advantage in some cases of disease. Caution, should be used, however, in carefully regulating the dose. Dr. Thomas, in an inaugural dissertation, published in Philadelphia, A. D., 1802, states that a case of diarrhœa

of eight weeks duration, was cured by a decoction made by boiling one ounce of the leaves, in eight ounces of water, down to four ounces. Thirty drops were administered six times a day, but this quantity produced a vertigo, and the dose was afterwards repeated only four times daily. Dr Barton was informed that the leaves in powder were used by an empiric with success in certain states of fever. Externally applied in the shape of ointment or decoction, they have proved useful in various diseases of the skin, as tinea capitis, psora and herpes, but caution is necessary in its use for this purpose, as the author just quoted states that nervous symptoms have resulted from the application of the decoction. Dr. Bigelow has seen the recently powdered leaves given in doses of twenty grains without perceptible effect.

The foregoing is all that I have been able to learn in regard to the properties of this plant by consulting various authors; but believing it possessed of medical virtues, which recommended it to more attention than it had yet received from the profession, I subjected it to the following experiments. The leaves were obtained, thoroughly dried and powdered. A dose of ten grains produced no effect; at the end of two hours I took forty grains more; but in neither case could the least change be perceived from the natural state of health. At another time, one ounce of the fresh leaves was boiled for a few minutes in a pint of water, and set aside in a covered vessel for several hours; the liquid was then decanted. A large dose of this preparation had no perceptible effect for half an hour; dimness of sight with apparent increase in the size of objects, and vertigo then came on. Afraid of allowing the effects to proceed too far, a teaspoonful of the flower of mustard was mixed in a little water and taken, with the effect of evacuating the stomach, but sufficient had already entered the circulation to produce very alarming symptoms; these were, extreme depression of the arterial action, cold extremities and blindness, following each other very rapidly; but it was remarkable that no

disorder of the intellect occurred, or any nervous symptoms that might not be readily accounted for by the extreme sedation; nor was anything observed in its mode of action that would lead us to consider it possessed of acrid properties, The effects of the Kalmia on the human system in health. hence appear to be those of an arterial sedative, unpossessed of the irritant or narcotic properties of others in the same class. It would seem well suited to moderate the action of the heart in hypertrophy, and other derangements of that organ, where repeated bleeding exhausts the patient and affords but temporary relief. The astringency imparted by the tannin it contains, combined with the sedative action on the heart and arteries, recommend it as a remedy in hemorrhages, diarrhœa, and dysentery. It is obviously indicated in all inflammatory affections; and in fevers where the grade of action is above the healthy standard. The fruit is possessed of similar properties with the leaves, and more astringency. "It is probable that other species of Kalmia—as the Kalmia angustifolia, or sheep-laurel, and the K. glauca, or swamp-laurel, have properties identical with those of the K. latifolia." The decoction used by Dr. Thomas is an ineligible preparation. The infusion or tincture would possess the active properties of the remedy in a much more uniform degree. The following would probably be a convenient mode of administering it.

R. Fol. Kalmiæ,	ʒij.
Alcoholis,	Oj.

Macerate for seven days and strain. The dose for an adult would be thirty drops, every two or three hours.

Chemical Analysis.—The dried leaves were infused in cold water and strained. It then gave copious precipitates, with alcohol and solution of sub-acetate of lead. The sesqui-salts of iron gave a precipitate of a greenish black color. Alcoholic and ethereal tinctures were of a deep green color; on adding water to one of them all the green color-

ing substance was precipitated, leaving the liquid of a light yellow color, on adding ammonia to this, after separating it from the precipitate, the color was changed to brown; an acid restored the original tint. The fresh leaves were subjected to distillation in contact with water; the product in the receiver had a milky appearance and possessed the smell of the plant in a high degree. A volatile oil condensed in the neck of the retort in minute drops, which were easily increased in size by applying a lamp so as to distill it from one part of the tube to another. It possessed a disagreeable narcotic smell, nauseous taste, and was without color. The decoction remaining in the retort did not exhibit the sensible properties of the plant in so great a degree as the distilled fluid. The former on being allowed to cool deposited extractive matter. The incinerated plant also yielded lime and potash. The constituents are hence inferred to be, .

Gum,

Tannin,

Chlorophylle,

A yellow coloring matter,

A volatile oil, { in which the active properties are
believed to reside.

Extractive matter,

Lime,

Potassa.

I was unsuccessful in all attempts at obtaining an organic alkali.

Alexandria, D. C.

ART. LII.—ON THE SOURCE, PHYSICAL AND CHEMICAL PROPERTIES, OF A SPECIES OF HUMAN GALL STONE.

BY E. NEAL, M. D.

THESE biliary concretions are often found in the hepatic and cystic ducts, or in the common duct of the liver, but by far the greater number, are derived from the gall-bladder itself, in which they are usually formed. At a post-mortem examination of a man, aged 80 years, we removed from that viscus, fourteen calculi which present the following characteristics.

They have a smooth surface, a tetrahedron form, with the angles somewhat rounded; are of a size varying from that of a pea, to a grain of Indian maize, having like it a fine yellow color, striated with lines of a dark brown. This coloring matter forms a crust of about two lines in thickness, is of a short fracture, easily broken off, enclosing a dark brown nucleus. They are insipid, and inodorous, having a greasy feel when rubbed between the fingers, and a specific gravity, little inferior to that of water, being about 0.998.

They are insoluble in water, and, when whole, in cold and boiling alcohol of 35° Baume; in the volatile oils and spirits of turpentine, in the dilute and strong acids, although the nitric changes their yellow color to a light red: but when powdered they are nearly soluble in boiling alcohol and ether. In a dilute solution of pure potassa, they undergo no change at the ordinary temperature, but in a strong solution, at the boiling point, they are partially soluble, the color changing during solution from a yellow to a blue, which is soon altered by contact with atmospheric air to a fine emerald green; which, again, by successive additions of nitric acid, is converted to a blue, violet and red, in the course of a few seconds. They melt at the temperature

of 100° Far., change to a dark brown color, and emit an urinous odor—at a still higher temperature they liquify, become oily, and assume on cooling a brittle mass; when heated still higher, they ignite, burning with a white flame, and much smoke, leaving a black residuum resembling animal charcoal. This residuum effervesces with chlorohydric and nitric acids, and with the former is almost entirely soluble in distilled water, yielding an agreeable and clear solution; with the latter acid, however, the solution is insipid.

From the above, and other experiments, we derive the following conclusions.

1st. That the crust of these calculi is composed of a peculiar coloring material, called by Berzelius, “bilifulvin,” which, we may add, is found in small quantities in a healthy person, but accumulates in a state of disease, as in jaundice, so as to produce solid masses. It is insoluble in alcohol and ether, in the strong acids, volatile oils and spirits of turpentine; but with pure potassa and soda, and some of their salts, makes a solution of a blue color.

2d. That this “bilifulvin” is converted into the green coloring matter, which is present in healthy bile by the absorption of oxygen,—its solution in potassa being changed from a blue by this means.

3d. That a peculiar fatty matter enters largely into their composition, called “cholesterine,” which is insoluble in water, fusible at 279°, and volatilizable in close vessels without change; its formula being $C_{36} H_{50} O$. It is dissolved by boiling ether and alcohol, which on cooling deposits it in brilliant plates of a pearly lustre,—it is not saponified or altered by caustic alkalies, but by a treatment with nitric acid is converted into cholesteric acid. $C_{26} H_{20} NO_{12}$.

4th. And lastly. That they are exceedingly analogous to the bezoar stones of the herbivorous animals, if they are not identical in every particular of their composition.

Philadelphia, December 20, 1844.

ART. LIII.—EXTRACT OF SENEGA AND SQUILL.

By JOHN H. ECKY.

Take of Senega and Squill in coarse powder each two pounds. Pour on sufficient diluted alcohol to cover them, and macerate in a covered vessel forty eight hours. Transfer to the displacement funnel, and add diluted alcohol, until it passes tasteless. Distil off the alcohol, and evaporate in a water bath to four pounds. This extract contains all the active properties of the Senega and Squill, and it appears to me, to be the best preparation that can be used for making the compound Honey of Squill, known as Cox's Hive Syrup, for which I give the following formula,

R. Ext. Senega and Squill,	1 lb.
Mel Despumat.	6 lb.

Mix the extract with the honey at a temperature of 160 Fahr., and to every pint of this add sixteen grains of Tartar Emetic. The result is a preparation always of the same strength, but much stronger than any that can be made by the old formulas, and one that will not ferment.

NOTE. A specimen of this extract was presented with the accompanying communication, at the pharmaceutical meeting of the Philadelphia College of Pharmacy. It was of *soft pulpy consistence*, of a dark shining colour, and highly endowed with the sensible properties of the ingredients. Several formulæ for preparing *Hive Syrup*, have been from time to time devised. That now contained in the United States Pharmacopœia, would seem, from ample experience so far, to meet all the requisitions proposed in its formation, and may be regarded as complete as it can be made, to furnish an elegant preparation. At first sight,

therefore, the proposition to prepare an extract to be used in the formation of the syrup may be regarded as superfluous ; but yet under certain circumstances it may have its advantages, among which the chief would appear to be the greater facility of transportation in a country like our own, where medicines are necessarily carried great distances, in which case the occupation of less space in packing becomes important. We are no friends to violation of our Pharmacopœia rules, but as our Journal is the neutral ground upon which all friendly propositions may be made, and the arena in which diversity of opinions may be stated, we look upon Mr. Ecky's communication as possessed of interest.—*Editor of Am. Journ. Pharm.*

ART. LIV.—PREPARATION OF NARCOTIC EXTRACTS.

By SCHEIDEMANDEL.

THE author describes his method, which he particularly recommends for the preparation of these extracts in small quantities, as follows :—

In this neighbourhood (Creussen) Hyoscyamus, Belladonna, Digitalis, Conium, &c., grow wild. I therefore gather the plants at the proper time, dry them carefully, and use them in the preparation of the extracts in the following manner:—

The plant, Hyoscyamus for instance, is thoroughly dried in a stove by a very gentle heat, until capable of being rub-

bed through a coarse horse-hair sieve. The very finest powder is separated and rejected.

The coarse powder thus obtained I place in a glass funnel of a certain capacity, the neck of which is partially obstructed by cotton loosely thrust into it, and on the top a piece of white filtering paper covered with a layer of sand, which has previously been purified with hydrochloric acid and well washed; this I also well wash after each operation, and dry and preserve for further use. The funnel holds exactly 4 oz. of coarsely-powdered *Hyoscyamus*. When it is thus arranged, I gradually pour on it spirits of wine of spec. grav. 0.950, in such proportion that the powder is penetrated by it to half the depth of the funnel. I now desist, and find in about half an hour the spirit has penetrated the powder throughout the whole depth of the funnel, and an alcoholic extract of a dark green color begins to drop into a glass vessel placed beneath.

When the dropping begins to slacken, I commence adding small portions of spirits of wine, about $\frac{1}{2}$ an oz. every quarter of an hour. If I commence the operation at 9 A. M., I can progress so far that by the evening I have added the last portion of the spirit, using 18 oz. of spirit in all. I now cover the funnel with a glass plate, and commence the next morning adding pure water in successive small quantities of an ounces in the same manner as with the spirit. This is continued until the drops are no longer green but brown, that is, until all the alcoholic extract is displaced by the water, and the watery extract begins to fall from the funnel. When this takes place, the receiver containing the spirituous extract is removed and well covered, and replaced by an empty one. The alcoholic solution in the glass removed is of a remarkably fine green color, with the well-known repulsive odor of *Hyoscyamus*. The treatment with the water is persevered in during the day in the same manner as with the alcohol, until the dropping fluid becomes transparent; I now once more add water; it is then

covered with the glass plate, and allowed to drain quietly during the night.

Whilst this extraction with water is going on, I filter the alcoholic solution from the waxy matter, and distil off the alcohol in a small steam apparatus, until only a few ounces remain. The fine green syrupy residue I then pour into a porcelain dish, and add to it the watery solution when evaporated to a syrupy consistence, and evaporate it gently over the flame of a small spirit-lamp until of the proper consistence, by which means I procure an extract that dissolves completely in water with a fine green color, and in point of activity leaves nothing to be desired. I proceed in the same manner with Belladonna, Digitalis, Conium, &c., and especially recommend this method to pharmacutists in small places, as affording a certain and active product both in a quantitative and qualitative respect.

I have always obtained 1 oz. 6 drms. of extract from 4 oz. of coarsely-powdered Hyoscyamus.

Ibid, from Buch. Rep.

ART. LV.—ON THE DEOXIDATION OF FERRIDCYANIDE OF POTASSIUM, AND OF SALTS OF THE PEROXIDE OF IRON.

BY PROFESSOR SCHÖNBEIN.

WHEN an iron wire with a clean surface is immersed in an aqueous solution of ferridcyanide of potassium, it becomes quickly coated with a layer of prussian blue; and if a number of such wires be placed in a similar solution, there very soon separates a considerable quantity of a bright blue body, which, by exposure to the atmosphere,

acquires a dark blue color. If into the solution of ferridcyanide air or pure oxygen be passed while it is in contact with the metallic iron, the formation of the blue substance proceeds more rapidly. When finely-divided iron is conveyed into the solution instead of iron wire, and air blown in through a glass tube, the reaction takes place still more rapidly.

However short a time the iron may have remained in contact with the solution of the ferridcyanide, the latter will have become so altered that it is colored blue when treated with a solution of a persalt of iron.

If the solution be boiled until all the air is expelled from it, and an iron wire, from which likewise the adherent air has been removed by heating in boiling water, be placed in it, the formation of the blue substance around the wire does not occur so long as the liquid is kept boiling, at least not in any perceptible degree. As soon, however, as the solution is allowed to cool, the metal is seen to envelope itself with a blue coating, *i. e.* if contact between the atmosphere and the solution of ferridcyanide be not prevented.

The solution of ferridcyanide was allowed to boil in a glass flask for ten minutes, and a number of bright iron wires kept in boiling water for the same length of time; the latter were then conveyed as quickly as possible into the boiling solution of ferridcyanide, and allowed to boil for a few minutes, upon which the flask was closed as airtight as possible. During the first day the wires remained perfectly bright, but on the following day several blue spots were observed on them, the number and size of which became larger and larger, and from which subsequently proceeded minute streaks of a somewhat dirty blue color. A similar flask was filled with unboiled solution of the ferridcyanide and bright iron wires, and left open. In a few hours not only had the wires become surrounded with a blue coating, but a large number of the above-mentioned blue streaks were seen to project from the wires into the

liquid. The occurrence of these blue streaks is a fact which deserves particular attention, since it appears to prove that the body resembling prussian blue is able to form at places in the solution of the ferridcyanide where there is no metallic iron.

If metallic iron be left sufficiently long in contact with the solution of ferridcyanide of potassium, the latter becomes almost entirely decolorized, and moreover loses the property of forming prussian blue on bright iron. Such a solution affords with pernitrate of iron considerable dark blue precipitates; with the protosulphate of iron, on the contrary, white ones.

Metallic zinc decomposes the solution of ferridcyanide no less rapidly than the iron. If bright laminæ of zinc be placed in an open vessel filled with this solution, yellowish-white points soon appear on them, and after some time a dirty white substance is deposited in the state of a powder at the bottom of the vessel. It consists, according to preliminary experiments, of the cyanide of potassium and zinc, which is probably mixed with some oxide of zinc. If only a trace of this white body be formed, the residuous solution of ferridcyanide is rendered blue by the nitrate of the peroxide of iron, and the precipitate of prussian blue is more abundant when the action of the zinc on the solution of the ferridcyanide has continued for some length of time. The solution, altered in this manner, is also no longer capable of producing prussian blue on bright iron. It is also a very remarkable circumstance that the solution thus altered by zinc disengages ammonia in perceptible quantity when hydrate of potash is added to it, and it is then warmed. In order that the above changes may be effected in the solution of the ferridcyanide of potassium by the zinc, it likewise appears necessary that free oxygen should be present.

When a solution of the ferridcyanide of potassium is brought into contact with arsenic, antimony, bismuth, lead

and tin, it is rapidly altered, and is colored blue with salts of the peroxide of iron. If the contact between metal and solution has lasted only for half a minute, and even at the ordinary temperature, there is nevertheless a perceptible blue coloring produced on the addition of the perntrate of iron to the solution; and if the metals in question be left for several days in the dissolved percyanide, this will afford considerable precipitates of prussian blue with persalts of iron.

It is remarkable that cadmium acts very slowly on the percyanide, and this metal must have stood for several hours in contact with the solution before the latter exhibits a perceptibly blue tint on the addition of perntrate of iron. Even copper, mercury and silver effect a change in the solution of the percyanide, and convert a portion of it into the proto-cyanide. But this reaction proceeds very slowly, and several days' contact is requisite for the solution to become blue on the addition of perntrate of iron.

A number of the above-mentioned metals lose their lustre (for instance lead) when placed in the solution of percyanide, and become coated with a film, the chemical nature of which the author has not examined more minutely. It is not improbable that they are compounds of cyanogen, as with zinc and iron. A very easy and simple manner of demonstrating the chemical alteration which the solution of the percyanide undergoes during contact with the above metals, consists in conveying a drop of the liquid to the bright surface of one of the metals, and then adding to it a drop of dissolved nitrate of iron. Immediately after the mixture of the two has taken place, the surface of the metal touched by them is coated with a layer of prussian blue, and the above-described reaction ensues almost instantaneously, even though the metals employed be copper, mercury or silver.

As will appear from subsequent details, the latter metals induce the formation of prussian blue principally from their converting the dissolved persalt of iron partially into a pro-

tosalt. The more readily oxidized metals, such as zinc, iron, tin, &c., give rise to formation of prussian blue under the above-mentioned circumstances in a two-fold manner. These metals quickly convert a portion of the percyanide into protocyanide, and a portion of the persalt of iron into protosalt.

The fact that even most carefully-cleansed plates of platinum, palladium and gold produce prussian blue when a mixture of the aqueous solutions of ferridcyanide of potassium and perntrate of iron is brought on to them, is highly remarkable. It is true that the change in this case takes place very slowly.

We are therefore apparently justified in concluding that all metallic bodies, without a single exception, are capable of producing the same effect on the haloid salt. If the solution of the cyanide be poured over finely-divided protoxide of copper or protoxide of tin, and both substances left only for a short time together, the filtered liquid is rendered strongly blue on the addition of perntrate of iron. Probably other oxides, which have a greater inclination to combine with more oxygen, behave in a similar manner.

But it is not only the metallic bodies or certain metallic compounds which are capable of exerting a chemical influence of the kind previously described on the solution of the ferridcyanide, but a series of non-metallic substances likewise exhibits a similar behavior. If phosphorus be held for some length of time in contact with the solution of the percyanide, the latter acquires the property of becoming blue (only indeed in a faint degree) on the addition of a solution of peroxide of iron. But if a piece of phosphorus be held in a mixture of percyanide and solution of a persalt of iron, and be allowed to remain some time in the liquid or exposed to the atmosphere, it becomes surrounded with a coating of prussian blue. This phenomenon appears, however, to be principally owing to the persalt of iron being partially converted by the phosphorus into a protosalt. Schönbein passed

pure hydrogen gas for some length of time into the solution in question; it appeared, however, to undergo no change whatever in its chemical constitution under these circumstances. But when the hydrogen came into contact with the dissolved percyanide, either in a nascent state or in certain chemical combinations, it had a different action. If two vessels, communicating with one another by means of a porous septum, for instance animal membrane, be filled with the dissolved cyanide, and the conducting wires of a somewhat powerful battery be conveyed into the liquid of these vessels, a portion of the solution of the percyanide in which the negative electrode is immersed, *i. e.* in which hydrogen is separated, is rapidly changed, and affords a blue precipitate with perntrate of iron.

Hydrogen combined with sulphur, selenium, phosphorus, arsenic, antimony and tellurium, although still gaseous in these combinations, acts nevertheless very rapidly on the solution of the ferridecyanide, and indeed in a similar manner to nascent hydrogen. If either one of the last-mentioned gases be passed for only a short time into the solution of the cyanide, it is so much altered by it that it affords blue precipitates with persalts of iron, even after the expulsion of any gas dissolved in the liquid. If the solution of cyanide, before being submitted to the action of any of these hydrogen compounds, be mixed with a solution of the perntrate of iron, a very considerable precipitation of prussian blue takes place on the entrance of the gas into the mixture. It must, however, be observed that the three first mentioned gases act far more rapidly than the three metallic hydrogen compounds are capable of doing.

If the solution of cyanide be allowed to stand with æther or alcohol for ever so long, it does not appear that the mixed substances act on one another under these circumstances, since a solution thus treated is not rendered perceptibly blue on the addition of a persalt of iron. But if, besides the æther or alcohol, some nitrate of iron be added to the dissolved cyan-

ide, the mixture soon begins to turn blue, and after some days a considerable precipitate of the most beautiful prussian blue has formed. It is therefore evident that the æther or alcohol has either changed the percyanide into protocyanide or the persalt of iron into protosalt.

If ordinary sugar be added to the solution of percyanide, and the liquid be kept boiling for a few minutes, it is turned blue on mixing pernitrate of iron with it. The mixture will also appear blue if some of the salt of iron is added to it ; after some hours, without any exposure to heat, and after some days there will be a considerable deposit of prussian blue.

When the solution of percyanide is mixed and warmed with formic acid, it becomes blue without requiring any persalt of iron ; if the mixture be evaporated until all acid is expelled and the residue extracted with water, this extract will afford with solution of nitrate of iron a precipitate of prussian blue. The same reaction takes place in the cold, only more slowly. Acetic, tartaric and citric acids act in a similar manner on the solution of cyanide, and probably several other organic acids. Oxalic acid appears to have no action either at the ordinary or at an increased temperature. Uric acid is remarkable, above all other organic compounds, from its quick action on this salt. If it has stood for only a minute with a solution of percyanide, this is rendered blue on the addition of nitrate of iron. A solution of creosote in water has perhaps a stronger action ; on shaking it for a few instants with a solution of percyanide, and then adding a persalt of iron, it is rendered strongly blue. If the excess of creosote has been expelled from the solution by heat, nitrate of iron causes a very considerable precipitate of prussian blue.

Cinchonine and morphine behave similar to uric acid and creosote, while strychnine and quinine appear to have no action.

When urea is conveyed into a solution of the percyanide,

it appears to have no action, but on evaporating the mixture to dryness, and warming the residue so as to disengage ammonia, the mass becomes strongly blue. No change of color ensues previous to the disengagement of ammonia.

The behaviour of nitrate of ammonia to the cyanide is likewise remarkable; if some of the salt be heated to fusion, and a few crystals of the ferridcyanide of potassium conveyed into the liquid mass, it immediately becomes of a dark blue, and there is a strong smell of prussic acid. If the mixture is still further heated, it assumes a reddish-yellow color, and now affords no further precipitate either with a persalt or protosalt of iron; but if the mass, while still blue, is treated with water, the filtered solution gives prussian blue with nitrate of iron. If a solution of the percyanide is added to one of neutral sulphate of ammonia, and the whole is evaporated to a pasty mass, it appears green. If it be now heated to fusion, it acquires a light blue color, and if some water be poured over the mass thus treated, it becomes deep blue, and there is a separation of prussian blue. The filtered liquid is not rendered perceptibly blue by nitrate of iron.

If a few drops of hyponitric acid are added to a mixture of ferridcyanide of potassium and nitrate of iron, there is a precipitate of prussian blue. Since pure nitric acid produces no change in the above mixture, this reaction may be employed to detect even small quantities of nitrous acid in nitric acid. Nitric oxide has a very energetic action on a mixture of percyanide and nitrate of iron; each bubble of this gas, on entering the solution, becomes surrounded with a blue coating, and prussian blue is very rapidly thrown down. Nitrous oxide behaves with perfect indifference towards such a mixture.

Sulphurous acid likewise possesses in a high degree the power of altering the dissolved percyanide in such a manner that it shall afford blue precipitates with persalts of iron.

Since the precipitation of prussian blue by the nitrous acid, nitric oxide and sulphurous acid from a solution of the above-

mentioned mixture of salts, might probably depend solely on those three combinations converting the persalt into proto-salt, while they leave unaltered the percyanide, the author convinced himself that the three bodies mentioned also exercise a decomposing action on the solution of the percyanide.

It was to be supposed that the bodies which reduced the ferridcyanide of potassium to ferrocyanide would likewise have a reducing action on the persalts of iron ; the following experiments entirely confirm this supposition. For instance, if a solution of nitrate of iron be left only for a few minutes, or for a shorter time, in contact with arsenic, antimony, bismuth, cadmium, lead, iron, zinc and tin, the solution of percyanide becomes perceptibly blue. Even copper, mercury and silver produce a similar change, but more slowly. Whether palladium, platinum and gold are able to effect it with time has not yet been ascertained.

Some protoxides, as for instance that of copper, when placed for a short time in contact with the solution of nitrate of iron at the ordinary temperature, alters the salt of iron in such a manner that the solution of percyanide is rendered blue by it.

Phosphorus appears to act more rapidly on the solution of the nitrate of iron than on that of the cyanide.

Sugar heated only for a short time with a solution of the persalt of iron likewise causes it to give a precipitate of prussian blue in the solution of the cyanide. Formic acid, warmed but for a few instants with the dissolved salt of iron, induces the formation of so much protosalt, that on mixing this liquid with the percyanide prussian blue is precipitated. Citric, acetic and tartaric acids behave in a similar manner, but lithic acid is most remarkable from its deoxidizing action. If this acid be left in contact only for a minute with a solution of the nitrate of iron, the filtered liquid has acquired the property of precipitating prus-

sian blue from the solution of the percyanide. Warming of the solution hastens the reaction of the lithic acid.

Creosote even surpasses lithic acid by its deoxidizing action on persalts of iron. Cinchonine and morphine act in a similar manner, but not so rapidly. Nascent hydrogen, in contact with a solution of persalt of iron, imparts to it the property of precipitating prussian blue from the solution of the percyanide.

Nitrous acid, nitric oxide, sulphurous acid, and the combinations of hydrogen with selenium, phosphorus, arsenic, antimony and tellurium, behave in a similar manner.

Dilute solutions of oxalic acid, nitrate of iron and ferridcyanide of potassium were mixed and conveyed into a flask, into which nitric oxide, sulphuretted and phosphoretted hydrogen were introduced. According to the preceding statements these gases precipitate prussian blue from a liquid containing only nitrate of iron and percyanide; in the mixture, however, containing oxalic acid, they cause no such precipitate, but in order to obtain this negative result it is requisite that there should not be too little oxalic acid present in the solution.

With respect to seleniuretted hydrogen, oxalic acid is not able to prevent entirely its action on the mixture, which immediately becomes blue. When a solution of the percyanide is placed in contact with lithic acid and oxalic acid, no blue coloring is produced by a persalt of iron, however long the substances may have been together, nor does heating in any way assist.

Oxalic acid likewise prevents sugar and other organic matters from altering the percyanide and the persalts of iron in the above manner, nor is there any prussian blue precipitated, even on adding nitrous acid to a mixture containing percyanide, nitrate of iron and oxalic acid.

Besides the interest which these experiments offer, they likewise lead to ready methods of detecting nitric oxide, nitrous acid and sulphurous acid. Moreover, since the or-

ganic bodies employed in this reaction are likewise subject to decompositions, a more accurate investigation of these relations will probably lead to the knowledge of many new compounds.

Chem. Gaz. from Journ. für Prakt.

ART. LVI.—ON THE FEBRIFUGE PROPERTIES OF VARIO-
LARIA AMARA.

By DR. DASSIER.

THIS lichen grows in the form of large grayish crusts upon the bark of beech-trees in mountainous regions. When reduced to powder, it excites its influence upon the pituitary membrane, and applied to the tongue, very speedily gives rise to a distinct bitter taste, which increases by degrees, and is retained for a considerable length of time. It was examined in 1831 by M. Alms, who extracted from it a bitter principle, to which he gave the name of *picro-lichenine*. If taken into the stomach, the powder of Variolaria creates an appetite, and acts like all bitter tonics by rousing the digestive powers and imparting a new vigor to the constitution. It does not appear to exercise any influence upon the nervous system, like the sulphate of quinine. By reason of its excessive acerbity, the Variolaria cannot be prescribed in the form of a moistened powder in a vehicle such as quina. M. Dassier has administered it in the shape of pills incorporated with conserve of roses, or in that of lozenges mixed with chocolate. It is best to prescribe it in doses of 7 to 15 grs. for adults, to be taken in the course of 24 hours, and of 3 to 6 grs. for children under 10 years of age. In quotidian and tertian fevers, those in which the

Variolaria has proved itself most efficacious, it has acted beneficially after the first or second dose, and 7 to 9 grs. have very often been sufficient to effect a cure. In cases, however, where the first doses do not act, we cannot reckon upon any good results.

M. Dassier has given Variolaria in a very great number of intermittent, quotidian, tertian and quartan fevers. In the second of these he has almost constantly, in the third kind frequently, in the last rarely, obtained a cure. It is true that he has never exceeded the dose of 1 grm. in the course of 24 hours. Despite the encouraging observations of M. Dassier, we are of opinion that the Variolaria should only be prescribed under the following circumstances. :—

1. As a substitute for sulphate of quinine.
2. In cases of mild quotidian or tertian fevers.
3. That recourse should never be had to its use where we suspect a severe attack of fever, or one that may assume a dangerous character.

It would be interesting, on account of its low price, and the ease with which it can be procured, to ascertain whether, if given in larger doses than has been above specified, its properties might not prove more efficacious. At all events, new researches upon the active principle of this lichen are well deserving of being made.

Ibid, from Journ. de Pharm.

ART. LVII.—ON THE DISTRIBUTION OF MINERAL SUBSTANCES IN INDIVIDUAL ORGANS OF PLANTS.

BY DR. A. VOGEL, JUN.

THE inorganic constituent parts are not in the same manner distributed throughout the whole plant, but they are in its several organs variously grouped. The ashes of the root and those of the trunk differ not only quantitatively, but also qualitatively, from the ashes of the leaves, flowers and fruit. Hertwig, at the request of Prof. Liebig, showed that this is the case with reference to some plants. For instance, the ashes of the tuber of potatoes are essentially different from the ashes of the herb of potatoes; the ashes of the bark are again different from those of the wood. I made some experiments with residues of ashes of individual organs of plants, with the view of assisting in finding out the laws by which the distribution of fixed substances in the individual organs of plants are regulated. Since in these experiments it was not the ashes themselves, but rather their mutual relation which was to be considered, it was naturally totally indifferent which was the plant that became matter of investigation. I therefore selected such plants as could easily and completely be converted into ashes; for the analysis of ashes containing much coal, viz., those which on continued ignition still contain 3—4 per cent. coal is always liable to great mistakes.

Through the kindness of Counsellor de Martius, I obtained from the Royal Botanical Garden at Munich several parcels of plants, which, their individual organs having been separated and washed, were reduced to ashes. To separate the soluble parts from those that are insoluble, I treated the ashes with boiling water. The residue insoluble in water was then dissolved in muriatic acid, and the phosphoric earths as well as the oxide of iron were afterwards, by

caustic ammonia freed from carbonic acid, precipitated from their acid solution. The liquid was then filtered, and the lime determined by oxalate of ammonia, and after this had been separated, the magnesia was precipitated by phosphate of soda.

I selected for the first experiment the ashes of *pyrus spectabilis*, and analysed the ashes of the trunk, the leaves and fruits, each by themselves.

1. *Trunk*.—The trunk, after having been cut into small pieces, burns easily, and on being calcined over a spirit lamp finally yields white ashes amounting scarcely to 0.1 per cent. carbon. Since they contained carbonic earths in considerable quantities, it was necessary to moisten them after calcination with carbonate of ammonia, to restore the carbonic acid which was driven off by the heat. Water dissolves but little of the ashes; in the watery solution, which is of a feeble alkaline reaction, are no phosphoric alkalies, but merely traces of carbonates contained. The constituent parts soluble in water amount to 4 per cent. These ashes consist chiefly of carbonate of lime, amounting to 82 per cent. Magnesia enters only at an admixture of a trifle per cent. The ashes contain 8 per cent. of insoluble phosphates, viz., phosphates of lime and phosphates of magnesia.

2. *Leaves*.—The ashes are perfectly white, and little soluble in water, which liquid extracts from them 7 per cent. of alkaline carbonates, with traces of sulphate of potassa, chloride of sodium and phosphate of potassa. These ashes, like those of the trunk, chiefly consist of carbonate of lime; in them, however, amounting to less by 10 per cent. The phosphate of lime and magnesia amount in these ashes to 10 per cent. The quantity of magnesia is nearly two-fold; it was 4.9 per cent., and is now 9.76 per cent.

3. *Fruits*.—Totally discrepant from both the ashes of the trunk and leaves are those of the fruit. The soluble parts of the other ashes amounted to 4—7 per cent.; those con-

tained in these ashes were 33.1 per cent., hence one-third of the whole quantity, which consisted of equal parts of alkaline carbonates and phosphates. The quantity of carbonate of lime is diminished to 37 per cent.; whereas the phosphate of lime and magnesia augment to 18 per cent. The phosphoric combinations, therefore, in the ashes of the fruit amount to more than one-third, namely, to 36—38 per cent. It is striking that some traces of silica are met with only in these ashes.

The amount of iron which has been determined by special experiments diminished from trunk to fruit. The quantity of iron, however, in the ashes of this plant is not material, amounting even in the trunk scarcely to 0.5 per cent. According to this analysis, the ashes are composed of:

Trunk.

Alkaline carbonates,	4.6
Carbonate of lime,	82.2
Carbonate of magnesia,	4.9
Phosphate of lime and magnesia,	8.8
	<hr/> 100.5

Leaves.

Alkaline carbonates, with traces of chloride of sodium, sulphate of potassa and alkaline phosphates,	6.8
Carbonate of lime,	72.9
Carbonate of magnesia,	9.76
Phosphate of lime and magnesia,	10.5
	<hr/> 99.96

Fruit.

Alkaline carbonates,	1.9
Alkaline phosphates,	14.1
Carbonate of lime,	37.
Carbonate of magnesia,	5.52
Phosphate of lime and magnesia,	18.6
Silica,	3.7
	<hr/> 97.92

If we compare the composition of these three ashes, we arrive at the following conclusions:—

1. The amount of salts soluble in water augments nearly exactly eight times, from trunk to fruit. The soluble salts of the ashes of the trunk, leaves and fruit of the plant examined, are in the proportion of 1 : 2 : 8. Here manifestly one intermediate proportion is left out. Is it, perhaps, formed by the flowers?

2. The phosphoric salts augment from trunk, and this is taking place at the expense of the carbonic combinations which from trunk to fruit are diminishing from 86 to 45 per cent.

To show the increasing amount of phosphoric acid in the ashes from trunk to fruit in one more instance, I examined three ashes of *sambucus nigra* solely with reference to their phosphoric acid. The phosphoric acid was determined after a method communicated to me by Prof. Liebig; a method which for its exactness and facility of execution is preferable to any other. The ashes to be investigated for phosphoric acid are merely to be dissolved in nitric acid, and the solution precipitated by an excess of acetate of lead. The precipitate contains phosphate of lead and sulphate of lead, if sulphuric acid was present, and basic nitrate of lead. It is to be calcined and weighed. It now consists of sulphate of lead, phosphate of lead, and oxide of lead. It is then again to be dissolved in nitric acid, afterwards sulphuric acid added, and next some alcohol, and the obtained sulphate of lead is to be weighed. From this the quantity of lead is calculated, which, as well as the sulphuric acid, the amount of that latter acid having been determined on treating another portion of the ashes by baryta, are deducted from the weight of the sulphate and phosphate of lead and oxide of lead. The remainder is phosphoric acid.

The quantity of phosphoric acid found by this method in the ashes of the trunk amounted to 10.5 per cent.; in those of the leaves to 13.6 per cent.; in those of the fruit to 20.3 per cent.

It is naturally impossible, by a few analyses of ashes of plants, to ascertain a general law; for the proportion of fixed constituent parts of individual organs differs in various genera of plants. The cereals, for instance, contain in their fruit no constituent parts which are soluble in water, whereas their straw contains them in no inconsiderable quantities.

It is to be regretted that the analyses of ashes, if conscientiously executed, require much time; to which circumstance it may perhaps be ascribed that till now no sufficient number of analyses has been performed. But the first impulse having been given by Prof. Liebig, in time this want will certainly be supplied.

Chemist, from Ann. der Chem. und Pharm.

ART. LVIII.—ACTION OF SOME OF THE ALKALINE SALTS UPON THE SULPHATE OF LEAD.

By J. LAWRENCE SMITH.

It has been for some time known that certain neutral salts possess the property of dissolving to some extent the sulphate of lead, which property belongs neither to the acids or bases constituting these salts. By referring to Berzelius' Chemistry, it will be found that the acetate and nitrate of ammonia are among the number. "1 part of the sulphate was dissolved in 47 parts of a solution of the acetate, of sp. gr. 1.036; and in 172 parts of a solution of the nitrate, of sp. gr. 1.144." In the *Annalen der Chem. und Phar.*, vol. xxxiv., 235, will be found the following statement under the head of *Reactionem*:—"Sulphate of lead is easily dissolved, and in large quantity, by a solution of

neutral tartrate of ammonia. A concentrated solution forms after some time a stiff jelly, like silica." This last is no doubt a double tartrate of lead and ammonia.

I had also observed, some time previously, that a solution of the citrate of ammonia, when poured upon the sulphate of lead and allowed to stand, altered the character of the sulphate; and this, with the other fact above stated, led to the examination of what was really the action of these as well as other ammoniacal salts in general, upon the sulphate in question, and it is found that in every case it was decomposed.

Citrate of Ammonia.—If a solution of citrate of ammonia be poured upon the sulphate of lead and shaken together, the clear solution will be found to contain the sulphate of lead, as shown by hydrosulphuric acid and a salt of baryta—(taking care in testing with the baryta to acidulate first with pure nitric acid, to prevent the formation of the citrate of baryta.) If they be allowed to remain several weeks in contact, the solution will be found to contain more lead, the sulphate having undergone decomposition, sulphate of ammonia and a double citrate being the result; as this latter salt is not very soluble, a large portion of it remains in the form of a precipitate. The rapidity of this change is in proportion to the concentration of the solution of the citrate. If instead of performing the experiment in the cold, we boil a tolerably concentrated solution of the citrate with the sulphate of lead, a very large quantity of the latter will be dissolved, and the solution become perfectly transparent; if it be set aside and allowed to cool, in the course of a few hours an abundant white precipitate will be formed, and upon testing the clear solution, sulphuric acid, ammonia, citric acid, and oxide of lead will be found present. The precipitate, when washed, affords citrate of lead and ammonia. I was at first inclined to think it simply a citrate of lead, attributing the ammonia present to some of the citrate not washed out; but from its

possessing certain characters which do not belong to the simple citrate, I consider it a double of lead and ammonia. It contains not the slightest trace of sulphuric acid. It was not analysed, from the difficulty of obtaining it perfectly pure, as the water used to wash it decomposes it, and as yet this difficulty has not been surmounted. So then the result of the action of the citrate of ammonia upon the sulphate of lead is, first to dissolve it, and subsequently to decompose it, forming the sulphate of ammonia and citrate of lead and ammonia.

Tartrate of Ammonia.—If a solution of this salt be added to the sulphate of lead and shaken with it in the cold, the clear solution will be found to contain both lead and sulphuric acid; and if set aside for few weeks, the precipitate will have changed its character, having assumed a crystalline nature; the solution will no longer contain lead, but the quantity of sulphuric acid present will be found to have increased. The precipitate now consists of tartrate instead of sulphate of lead, which is completely soluble in dilute nitric acid, affording no precipitate with a salt of baryta. If the mixture of the tartrate and sulphate be boiled, this change takes place more rapidly, and in a manner somewhat different from the case of the citrate; the sulphate will not be dissolved in such large quantities, and, moreover, by continuing to boil the solution after the sulphate has been completely dissolved, the tartrate forms during the ebullition, and is precipitated in little shining crystals. If the ebullition be continued a sufficient length of time, the whole of the lead previously dissolved will combine with the tartaric acid. This is different from what takes place with the citrate, which, when boiled upon the lead salt, dissolves it, and no length of ebullition will produce a precipitate. The action of the tartrate is first to dissolve the sulphate, decompose it in part, and form a double tartrate of lead and ammonia, which last salt is subsequently decomposed by continued contact with water, or still more rapidly by its solution being boiled.

Acetate of Ammonia.—This salt also dissolves to some extent the sulphate of lead, but not so readily as either of the above salts. If the solution be boiled and evaporated to dryness, crystals of sulphate of ammonia are obtained, and an uncrystallizable salt of lead, probably an acetate of lead and ammonia; from the difficulty of separating the sulphate of ammonia from it, it is impossible to pronounce positively whether it is a double salt or simply an acetate of lead. We see in this reaction the existence of a soluble salt of lead and the sulphate of ammonia simultaneously in the same solution, without a precipitate being formed.

Oxalate of Ammonia.—Dissolves but slightly the sulphate of lead, owing, no doubt, to the impossibility of forming a double salt; but it will nevertheless decompose largely, the sulphate furnishing the oxalate of lead.

Muriate of Ammonia, if boiled with the sulphate of lead, will decompose it instantaneously, furnishing the chloride of lead and sulphate of ammonia.

The *Nitrate of Ammonia* does the same, forming nitrate of lead and sulphate of ammonia.

Carbonate and Succinate of Ammonia produce similar effects.

The action of most of the corresponding salts of potash and soda was examined, and with very similar results. The fact is, it would appear that those alkaline salts which dissolve the sulphate of lead, decompose it, without reference to the time occupied in the solution, as in the case of carbonate of ammonia, which decomposes the sulphate at the very instant of its solution; and it is impossible to detect at any one time other than a trace of lead in solution, whereas the quantity of sulphuric acid is constantly increasing.

The explanation is clear: the sulphate of lead is a salt with a strong acid and feeble base; the alkaline salts used contain feebler acids and stronger bases; they dissolve the sulphate, thus affording an opportunity for the acids and bases to act upon one another, under favorable

circumstances, and to follow a natural law in chemistry, the stronger acid combined with the stronger bases, and *vice versa*.

From the above facts, some important hints might be afforded to analytical chemistry, for it will be at once seen that the presence of any of the alkaline salts in a solution from which it might be wished to precipitate lead in the form of sulphate, would affect the accuracy of the result. What is true of the sulphate of lead may be found also true for other insoluble salts. Moreover, this shows the importance, in the analysis of mineral waters for instance, of weighing well the relative strength of the various acids and bases therein found, in order to ascertain what salts are present, and not to be contented with evaporating the water to dryness, and considering such salts as remain to be those existing in the water, for many of them may be formed during the evaporation. It is not at all improbable that before many years the examination of mineral waters will be based as much upon calculation as upon analysis, the former, of course, being guided by the latter, and by certain laws not yet developed.

Ibid, from Am. Journ. of Science and Arts.

ART. LIX.—ON THE DIFFERENT KINDS OF CALCINED
MAGNESIA EMPLOYED IN MEDICINE.

By M. MIALHE.

It is in consequence of some remarks published concerning an *advantageous formula for employing magnesia as a purgative*, which I last year inserted in the Bulletin de Therapeutique, that I have been led to make the chemical

and therapeutical observations concerning the varieties of oxide of magnesium found in pharmacy, which I now make public.

The following is the formula in question:—

Medicine of Magnesia.

R —Calcined magnesia,	8
Simple syrup,	80
Orange-flower water,	20

Bruise the magnesia carefully with a little syrup, and, when the mixture is perfectly homogeneous, add the remainder of the syrup and the orange-flower water.

Four months after the publication of this formula, M. Gobley, our colleague, was led to prove a chemical phenomena with which I was partially acquainted, but to which chemists had not called attention, namely, the property which recently calcined, that is to say, anhydrous, magnesia possesses of remaining liquid when in contact with a certain quantity of water, and of afterwards becoming, in the hydrated state, solid after 24 hours' contact.

The consistence which the potions had acquired was due to the solidification of the water by the magnesia, or rather to the hydralation of the magnesia.

However, I would observe that the two magnesian potions which have served for the text of M. Gobley's publication, had been prescribed with a smaller quantity of syrup than that I have indicated in my formula, which rendered their solidification more easy and more prompt. This fact was, moreover, proved by the author.

Although, says he, in this potion the magnesia is in contact with only six parts of water, there was no solidification in 24 hours; this is owing to the large proportion of sugar in the mixture. Indeed, if we diminish the syrup, and replace it by an equal quantity of water, the mixture solidifies in 24 hours.

From this, M. Gobley concludes that it will be necessary

to prescribe the *medicine of magnesia* with the proportions I have indicated when it is to be taken in less than three days; but that it will be necessary to increase the proportion of water when it has to be kept longer.

The following, according to M. Gobley, is the formula of a *draught of magnesia*, which may be kept liquid for an indefinite period:—

R—Calcined magnesia,	8
Syrup of orange flowers,	30
Distilled water,	87

I am now going to point out how it is that I have not observed solidification of oxide of magnesia in preparing my draughts: and, first, I might remark that the medicine of magnesia belonging to the class of medicaments prepared only when wanted, that is to say, magistral medicaments, I had not attended to its conservation; but I can make no such excuse. Here is the truth. After having theoretically and practically proved that the presence of sugar in the magnesian draught greatly augments its efficacy, which, to me, was indisputably established some time before the publication of my formula, I made some experimental investigations to ascertain whether all the varieties of calcined magnesia were equally adapted for suspension in syrup; if all were equally miscible in that vehicle, and I soon ascertained that the light variety of calcined magnesia is best adapted for preparing the purgative draughts having oxide of magnesium for their base. Moreover, experience taught me that all the varieties of light calcined magnesia are not equally fit for employment in the preparation of *white medicines*. That which appeared to me to succeed the best, and to which, consequently, I give the preference, is a variety of oxide of magnesia generally well decarbonated, very white, which has been very common in commerce for some years, and which is said to come to us from London.

The medicines of magnesia prepared with the English calcined magnesia, of which I have just spoken, present the form of a white and very homogeneous liquid, of the consistence of a clear syrup, and *may be kept liquid for an indefinite period.*

What was my surprise, after this description, to learn that the magnesian draughts prepared by M. Gobley had presented to him totally different physical properties!

To what could the difference of our results be owing?

Was it to the chemical nature of the oxide of magnesia employed by me?

But my magnesia was pure: it did not contain even appreciable quantities of carbonic acid.

Was it due to the presence of a certain quantity of water which the English decarbonated magnesia might, perhaps, contain?

I thought for some time that it must be thus, being convinced by analysis that this English magnesia really contained water; that it contained as much as 20 per cent. of its weight, that is to say, one-fifth.

However, it was not to this that the difference of the results was owing; for, having prepared a hydrate of magnesia similar to that of London, and having prepared with it a *medicine of magnesia*, the latter acquired, after several days, a consistence incomparably greater than English decarbonated magnesia takes under the same circumstances.

I wish for a moment to call the attention of practitioners to the intimate nature of the light calcined magnesia which comes to us from London, and which I will designate under the name of hydrate of magnesia, or better still, under the name of *slaked magnesia*.

Hydrated or Slaked Magnesia.

This commercial variety of decarbonated magnesia is very white, very light, very soluble in the acids, and con-

tains little or no carbonic acid. It always contains a very great quantity of water, varying in proportion from 12 to 20 per cent., as I have ascertained by experiment.

For some time I thought that I was the first to prove the presence of water in light English calcined magnesia, but I hasten to declare that this is not the case. M. Dubail, in his excellent Inaugural Thesis, has devoted an article to it, from which I will quote some passages which leave nothing to be desired :—

“For some time decarbonated magnesia has come to us from London, it appears, which is sold at a lower price than it can be manufactured for here, whatever economy be used.

“This magnesia is rather lighter than ordinary calcined magnesia ; it dissolves like it, and more easily, without effervescence, in the acids. It gives no indication of any foreign base—it is therefore regarded as pure ; but, when calcined, it loses 20 per cent. of water.”

What is the true nature of this variety of decarbonated magnesia ? I had presumed for an instant that this oxide of magnesium should constitute a hydrate in definite proportions ; the same idea occurred to M. Dubail, but I was very soon convinced of the contrary ; it is a mixture of hydrate and non-hydrated oxide ; it is a hydroxide in variable proportions.*

By what process has this decarbonated magnesia been obtained ?

This calcined magnesia has certainly been prepared by the ordinary method, namely, by the calcination of the hydrocarbonate ; but it has afterwards been exposed to the damp air for a more or less long time, or it has been purposely exposed, which is probable, or it has accidentally become exposed during the journey ; however, by exposing recently calcined magnesia to humid air, I have produced, in two or three days, an hydroxide of magnesia in every

* The true hydrate of magnesia contains 30 per cent. of water.

respect similar to that which comes from London, and capable of replacing the latter in the preparation of magnesian draughts, which is not the case, as I have already said, when hydroxide of magnesia has been instantaneously prepared.

Nothing is now more easy than to give an explanation of the different properties which the two varieties of hydroxide of magnesium just mentioned, present; there is between these two compounds the same difference as between lime spontaneously slaked in the air, and lime suddenly slaked by a sufficient quantity of water. Every one knows that the latter alone can be employed in masonry, because it alone is susceptible of producing solidifiable mortars. Is it necessary to observe that lime spontaneously slaked in the air is analogous to English hydroxide of magnesium and that ordinary slaked lime is analogous to hydroxide of magnesium, prepared immediately? No; doubtless. But, perhaps, it will be asked of me, how do you conceive that magnesia can be hydrated in the air, without evidently absorbing carbonic acid? This is, because it is no true that oxide of magnesium has as much affinity for this acid as chemical books would lead us to believe; it is because this metallic oxide has a much greater affinity for water than for carbonic acid. Its affinity is even so small that calcined magnesia, kept in a dry place, may be preserved in tact for several years, as I had an opportunity of proving, in 1829, at the Pharmacie Central, in concert with M. O. Henry. I will say more: having passed a current of carbonic acid over dry oxide of magnesium, the proportion of carbonic acid absorbed was entirely inapplicable. Thus, it is certain, that calcined magnesia has a much greater affinity for water than for carbonic acid; it is quite as certain that this base absorbs carbonic acid only after having passed to the state of hydrate, and that, even then, this absorption is infinitely less than had previously been supposed. The same phenomenon is presented with lime; this

base has also a greater affinity for water than for carbonic acid. This explains how it occurs that we never find the lime in mortars saturated with carbonic acid, however old they may be, as M. D'Arcet has proved.

There is between lime and magnesia an analogy of chemical actions, which has not sufficiently attracted the attention of chemists, and which has long been impressed on my mind. The following is what I said of it in 1828, in my little work on the solidification of balsam of copabia by magnesia:—

“It is necessary to prolong the calcination of the magnesia until this metallic oxide is almost insoluble in the acids; in this state its causticity is extreme; put on the hand, it burns it almost as promptly as oxide of calcium.”

Thus, then, it is to my mind indisputably demonstrated that there exists between magnesia and lime an extremely great analogy of chemical properties. There is a caustic magnesia, a quick magnesia, as there is a caustic lime and a quick lime; and there exists a slaked magnesia, just as there exists a slaked lime.

The chemical considerations which I have just made known, which are not very important at first sight, acquire a different interest when examined in a therapeutical point of view; this is because caustic or quick magnesia, and hydrated or slaked magnesia, present very different medical properties.

Caustic magnesia, like caustic lime, can never be employed in medicine, at least in a high dose; but, on the other hand, it is the only preparation of magnesia suitable for solidifying balsam of copabia. I know that several samples of balsam of copabia have been unjustly regarded as bad, and discarded as such, and this because the magnesia employed for testing it was hydrated, and consequently, improper for the purpose.

The following is my reason for saying that caustic magnesia should never be employed in a high dose:—First, because it is more difficultly soluble in the acids of the stomach

than hydrated magnesia, but especially because, having the property of combining with water, of being able to solidify ten times its own weight, it results that when it is introduced into the stomach in a large dose, from eight to sixteen grammes, for example, this oxide appropriates to itself the liquids contained in that organ, renders them solid, and dries the mucous membrane, which is found in some measure masticated by the hydrate of magnesia produced in this case. Hence the explanation of the thirst which always more or less accompanies the administration of a large dose of caustic magnesia; hence also the explanation of that pinching, of that species of organic tenesmus which the patient always suffer when they neglect to drink large draughts of water after swallowing it.

This pathological state, occasioned by the employment of caustic magnesia, is so marked in certain persons that they are forced to suspend its use.

Thus, for example, I have, from Dr. Emery, the calcined magnesia, which he has been obliged to renounce on account of the indisposition caused by taken it, and to substitute for it the hydrocarbonate, which did not produce the same effect. Which difference of action that skilful practitioner explains by admitting in anhydrous oxide of magnesium the presence of a certain quantity of caustic alkali, potassa, or soda in the free state, but which is very certainly attributable to the magnesia itself.

From the foregoing, it indisputably results that practitioners will do well to renounce the use of recently calcined magnesia, and to substitute for it, not the hydrocarbonate of the shops, but, indeed, hydrated or slaked magnesia, that is to say, the hydroxide of magnesia obtained spontaneously in the air, like that which comes to us from England. Now, although a slight variation in the dose of a substance is innocent, as magnesia cannot bring about any bad result, it is, however, more rational to adopt the medical employment of magnesia in invariable proportions; that which ap-

pears to me to combine all the desirable conditions, that which especially, is most convenient for preparing purgative draughts of magnesia, well lies, and very homogeneous, is that formed of four parts of oxide of magnesium, and one part of water. This hydrate will, therefore, be designated under the name of magnesia hydrated to one-fifth, as magnesia slaked with one-fifth.

The hydrate of magnesia of which I speak is, I repeat, best suited for the preparation of the medicine of magnesia; and, as in this respect, I give it an exclusive preference over all other varieties of calcined magnesia. The following is my formula for this kind of medicine:—

Medicine of Magnesia, or White Medicine.

R Magnesia hydrated to 1-5th,	8
Sugar syrup,	80
Orange flower water.	20

This medicine should be taken at one dose in the morning, fasting, and immediately after its administration half a glass of cold water should be drunk, but not more, experience having taught me that taking too much liquid weakens its purgative action, which is owing to a portion of the magnesia passing the pylorus, and, consequently, escaping the solvent action of the acids of the gastric juice and the lactic acids, produced by the stomachal digestion of the sugar.

The medicine of magnesia prepared according to my formula, is more active than that obtained by the following, the formula which M. Gobley has proposed to substitute for it, as I have ascertained by chemical experiments, which is, doubtless, owing to the latter containing an infinitely smaller quantity of sugar.

These effects of the medicine of magnesia are constant; it is only in a few subjects enfeebled, and incapable of supporting any nourishment, that I have known it necessary; it is the purgative of people who digest. This purgative

ordinarily acts only five or six hours after it is taken, rarely after, more rarely before.

As the action of the magnesia is slow in appearing, it is well to observe here that it is not necessary to await its effects to take food; it may be taken, without inconvenience, three hours after its administration.—*Ibid.*

ART. LX.—ON THE ALTERATIONS AND ADULTERATIONS OF ALIMENTARY SUBSTANCES.

BY A. CHEVALLIER.

THE following petition was addressed by M. Chevallier to the Chamber of Peers and the Chamber of Deputies; but the Session was terminated without its having been made the subject of a report as to the measures to be taken for the prevention of the frauds specified in it:

To the Members of the Chamber of Peers, and to the Members of the Chamber of Deputies.

GENTLEMEN,—Before determining to avail myself of the right of petition, which belongs to every citizen, and before resolving on disturbing your numerous and important occupations, I have considered it my duty to ask myself whether the abuses which I think it my duty to lay before you were serious—whether they were of a nature to injure commerce—whether they might compromise the life and health of mankind—finally, whether they deserve special attention.

The serious examination which I have made of every

thing relating to the adulteration of commercial and alimentary substances, has shown me that the necessity for a prompt and severe repression of these frauds should fix your attention. Indeed, the adulteration of commercial products is so injurious to our foreign commerce, since, in consequence of the succession of frauds which are practised in the preparation and manipulation of various products, these products are rejected at foreign places of commerce, whence it results that our artisans lose their work, and our merchants their reputation, and that they do not derive the benefit they might hope for from the practice of their profession if it were legitimately exercised.

In the second place, the aliments, drinks and condiments, destined to sustain the life of man, and to supply the wants of their daily existence, are the subjects of frauds which may, in a great number of cases, injure the health of those who use them, but which in all cases have for their object the substitution of a cheaper for a more expensive product.

According to this explanation, commercial frauds, and the adulterations of alimentary and condimentary substances being in the highest degree injurious to the health and interests of the population, and to the prosperity of commerce, we think that it becomes indispensable that a law be made to prohibit existing frauds, and to prevent those which are daily springing up.

In our opinion, in such a law, the simple adulteration of a substance by a product of less value should be considered as a daring theft, which we do not notice, and which is daily renewed, because we are on our guard against the ordinary theft, whilst no precaution is taken against a tradesman who may cheat every day. This deception, when it is practised on the middle classes, is prejudicial to them, but it is much more so to the workmen, since those who exercise it deprive them by fraud of part of their laboriously-earned wages.

In some cases, applicable only to the healing art, adulterators are, in my opinion, guilty of the crime of *voluntary homicide*, in substituting inert for active products which might determine a revulsion by which the patient might be saved. We will mention, as an example, the adulteration of the farina of mustard with the farina of the cakes arising from the manufacture of oil of colza.

We will leave to men of high merit, and who have recently given their opinion concerning commercial frauds, and the *marques des fabriques*, the task of informing you what are the commercial frauds which injure the prosperity of our commerce and our industry; we will only make known to you that which we have observed relative to the sale of alimentary substances, drinks and condiments—substances which are indispensable, and to which we wish to call your attention.

The frauds of alimentary substances have been proved as follows:—

1.—*Of Flour destined for the preparation of Bread.*

It has been ascertained that the flours sold, as being of good quality, were altered, and that they had undergone an acid fermentation; that others were adulterated with potato-fecula, others with farina prepared with legumens bitten by insects, and which could not be sold without being altered in form; powder of alabaster has been mixed with flour; the fraud has even been carried to such a point that mineral substances, reduced to the state of powder, have been offered *in the market* in the Department of the Seine, to be mixed with flour.

We do not think that the addition of fecula to farina can be injurious to health, but it is a robbery on the part of the vender against the baker; for fecula introduced into farina, and made into bread, *as farina is*, does not absorb water, and does not yield so much bread as farina; it is a

robbery against the consumer, if bread prepared with farina mixed with fecula, and which contains less gluten, is, as many scientific men think, less nutritious; it is a robbery, especially injurious to the workmen, who cannot, like the rich, like men in easy circumstances, eat as much meat as they will.

We are convinced that a white, savory, and wholesome bread might be prepared with fecula and wheat flour in the proportion of 25 to 50 per cent. of farina to from 50 to 75 of fecula, which might be sold at a lower price than bread made of pure wheat-flour, but the composition of this bread should be notified by the maker and sold at its real value.

2.—Of Bread.

The frauds in this article of food are happily much more rare in France than in a neighboring country (Belgium,) where the sulphates of copper and zinc are added to the paste, in consequence of the erroneous idea that the addition of these salts gives rise to a more considerable production of bread.* This culpable adulteration was, for some time, practised in France, but it has been totally abandoned for some years.

It is a positive fact that *baked potatoes* are used in the preparation of bread, and that a patent has recently been sold for the application already made of this mode of panification.

We do not think that the Administration can forbid him who prepares bread for his own use to introduce into it any substances he pleases; but we think that the Administration should not tolerate in Paris the introduction, by the baker, of any substance whatever into the bread sold for public

* The Court of Appeal at Brussels, M. Espital, President, has confirmed the sentence which condemned a baker, named Pennincky, to two years' imprisonment, and a fine of 200 florins of the Low Countries, and deprived him of his *right of patent*, for having introduced sulphate of copper into the bread which he prepared.

consumption ; indeed, in the capital bread is taxed, and the tax is based *on the employment by the manufacturer of pure farinas, and not of other substances, whatever they may be, even if superior to farina, which is not the case.*

If a baker has discovered a process, or if a process of manufacturing bread be communicated to him, which is economical, he should not make use of it except with the authority of the Administration, which should judge of the wholesomeness of this process, and which must then study the public interest.

This process, put in practice, might have the advantage of reducing the price of bread, and it is known, according to M. Chabrol *that the diminution of 10 centimes per kilogramme of bread is of high importance* to the poorer classes inhabiting the capital. Indeed, that learned Minister has proved *that by admitting that there exists in Paris 500,000 consumers of bread of the poorer class, 5 centimes per day increase in their expenses in the purchase of bread would give, per annum, a sum of 9,125,000 francs.*

If we suppose that by economical and wholesome processes, a diminution of 10 centimes per kilogramme of bread could be obtained, *this aliment being as nutritive*, an annual saving of 9,125,000 francs to the poorer classes would be effected.

The proportion of water contained in bread sold for consumption merits, we think, all the attention of the Administration ; indeed, a loaf of 2 kilogrammes, which will weigh only this weight, may represent more nutritive matter than a loaf in which the 2 kilogrammes are complete ; in the one, the water has been evaporated by baking ; in the other, the water has not been able to volatilise, and adds to the weight.

The legal exercise of the trade of baker in Paris deserves the attention of the authorities, for it is difficult ; indeed, he who exercises it is always suspected, even when he is honest ; the probity of the baker is not believed, and he has

always been represented as committing fraud. It is extraordinary, that when insurrection disturbed the streets, the bakers did not fall victims to a reputation which some of them may merit, but which should not be imputed to the greater number of them.

A just and severe law should severely punish the man who, charged with furnishing us with an indispensable aliment, wilfully deceives us; but this law should be based on regular studies and practical facts; its execution should also be made in an ostensible manner. Thus, a profession would be relieved, so that an honest man who exercises it may not run the same risks as one who enriches himself by daily delinquencies, an unfortunate result, since it puts the honest man and the rogue on the same level, also, the honest man is injured by the rogue, who reproaches him with what he calls his *ingenuity*.

3.—*Of Meat.*

This aliment is sometimes sold of false weight, and at other times it is spoiled when put up for sale. Our observations on the sale of spoiled meat have most frequently regarded meats which have been cooked.

4.—*Of Milk.*

Nine-tenths of the milk sold in Paris is diluted with one-third of water, to which, for some time, a little cassonade or caramel has been added; finally, bicarbonate of soda to prevent the milk from turning.

Some years ago, farina, fecula, rice-flour and gum, were employed for adulterating milk; it appears that these substances have been abandoned by adulterators.

The adulteration of milk in Paris would be difficult to repress, because the poorer classes are in the habit of paying for milk less than its value. It would be indispensable, before seeking to suppress this fraud, to make the public com-

prehend that they would be obliged to pay one-third more for milk than is paid at present, and that it is obtained at a low price only because it contains at least one-third of water and only two-thirds of milk. The population have been wrongfully disgusted by the publication of statements that milk has been prepared with the brain of animals, and especially with that of horses killed at Montfaucon; all the investigations made with the view of ascertaining the truth of this statement have demonstrated the falsity of a fact advanced it is not known with what object.

5.—*Of Beer.*

The beer sold in Paris should be made only with the seeds of cereals, properly prepared, and with hops. It is known, however, that a portion of this drink is the result of an operation into which enters, instead of malted barley, syrup of fecula, which sometimes contains a salt of copper, and that the hop is sometimes replaced by leaves of box and menianthe.

It would be, in my opinion, easy to suppress these frauds, since the brewers who commit them are liable in a fiscal point of view, by persons employed in the Administration, who might give useful information concerning these unwholesome preparations.*

6.—*Of Culinary Salt.*

Common salt—that indispensable condiment which enters into the preparation of our food—has been the subject of numerous frauds, which have been partially suppressed, but not totally.†

* We are assured that in France, as in England, substances of extreme activity are employed for giving bitterness to beer! but hitherto the truth of this assertion has not been demonstrated to us.

† The endeavors made by the orders of the Prefect of Police to suppress this fraud have been immense; the members of the Council of Health have submitted to chemical analysis more than 4,000 samples of salt, and yet it is still adulterated.

Salt has been mixed:—1st, with crude plaster (plaster-stone reduced to powder,) and this adulteration was so great in Paris that an establishment was fitted up by a manufacturer for the pulverisation of this stone, which was afterwards sold in commerce under the name of *powder to be mixed with salt*; 2nd, with granite reduced to powder; 3rd, with salts of varech and salts of every kind arising from various manufactures of chemical products. It must be remembered that, in 1827, an epidemic, which attacked more than 400 persons, was caused by culinary salt sold in the department of Marne. This salt was subjected to several experiments, and it was discovered that it contained iodides and arsenic. It was not known at first to what to attribute the presence of arsenic in this salt; but it was learned some time afterwards that this salt had given rise to these accidents arising from a manufactory in which salts of varech were refined, destined to be mixed with refined common salt. Similar salt was sold in Paris, and rendered ill a family named Pymor. This salt caused swelling of the face, pains in the head, ardent thirst, inflammation amygdalæ of the α , and intolerable pains in the course of the stomach and intestines, followed by a diarrhœal flux, almost always sanguinolent.

The mixture of salts arising from manufactures with alimentary salt, may present very great danger. The *Presse* of December 17, 1843, states that, at the Hague, more than eighty persons were poisoned by using, for seasoning their food, salt procured from a manufactory at which it was sold for a very low price. Experiments demonstrated that this salt contained an arsenical preparation.*

White salt has been mixed with salts of varech and with

* A letter from M. Wrydag Zinem, pharmacien at the Hague, has since informed us that the salt sold at the Hague had been mixed with arsenic by the grocer's servant, with the object of driving away the customers from his master's shop in order that he might have the less work to do.

the salt resulting from the extraction of saltpetre. Some of these salts contained a compound of copper arising from the boilers in which these products were evaporated. *We have seen* white salt destined for the soldiers; this salt was salt of varech, which was reduced to small grains by passing through a sieve of copper-wire, covered with verdigris.

7.—*Of Fecula.*

Fecula is mixed with the carbonate of lime. Quite recently we have found some which was mixed with alabaster, arising from the manufacture of pendulums and various objects of art. The proportions of powder of alabaster, added to fecula, have been ascertained to be from six to seven per cent. This fecula was, however, contained in bags bearing a printed label as follows:—"Potato-fecula, purified for alimentary use and for children."*

8.—*Of Sugar.*

Sugar has been adulterated with sugar of fecula, earthy matter and sugar of milk. These substances are not, it is true, injurious to health; but they are cheaper than the sugar for which they are substituted.†

9.—*Of Chocolate.*

The chocolate sold in Paris is often mixed with fecula, farinas and sometimes with an inert powder prepared by bruising cocoa-nut shells. These substances are inert it is true; but we should not buy the chocolate containing them if we were informed of the fact by the label.

* The Administration having knowledge of this fact, because Sieur R., manufacturer of objects of alabaster, had offered his powder at various establishments, to merchants of good faith, the Prefect of Police ordered investigations on the subject.

† This fraud had attained such a height, that enormous masses of ice were manufactured to be mixed with sugar.

A fact which proves the adulteration of chocolate is that this product is sold below the market price ; however, the manufacturer should have this profit on the sale.*

10.—*Of Honey.*

Honey is adulterated with fecula and syrup of fecula. We have seen honey prepared with syrup of fecula, which had become solid in the barrel, so that the grocer who had bought it did not know what to do with the product, which, owing to its solidity, could not be sold to the public.

11.—*Of Colored Sweetmeats.*

Colored sweetmeats, bonbons, and lozenges have long been the subjects of serious apprehensions to the Government; saccharine matters intended for children have been colored with arsenite of copper, with gamboge, with vermilion, with blue ashes, with chromate of lead, and with red lead; liquors owe their green color to a salt of copper. The limited number of manufacturers has enabled the Government to take measures which have been effectual. These measures consist in causing the shops and manufactories, where these sweatmeets are prepared, to be visited, and in causing the substances employed to be analysed by members of the Council of Health of the Department of the Seine. These members, besides these visits, give, throughout the year, gratuitous advice to the confectioners who wish to employ new coloring matters. It is in consequence

* The following statement was made by a manufacturer who sold chocolate at 70 centimes the $\frac{1}{2}$ kilogramme, and from whom a sample of chocolate of inferior quality was taken :—"I do not think that a worse quality of chocolate could be manufactured. This manufacture is disgraceful to commerce, and I make it only in my own defence and to sustain competition. I have but one regret, which is, that the Government has not the power to oppose this pitiful manufacture, which consists, simply of making chocolate with the last residues of cocoa. (He might have added, with the addition of fecula.) As we descend in the quality of bread, to preparing it with bran for animals."

of this measure that we have known that a color manufacturer sold to a confectioner for factitious ultramarine, an inoffensive blue color, a poisonous mixture, formed of 60 per cent. of ultramarine and 40 per cent. of blue ashes, carbonate of copper.

12.—*Of Salad Oil.*

Olive oil is daily adulterated with an oil known by the names of white oil and oil of carnations, which is of less value, and whose quality is not the same.

To give mixed oils the appearance of olive oil, solid fatty matters are often added, which give them the appearance of olive oil rendered concrete by cold.

13.—*Of Cider.*

The cider sold in Paris is rarely pure; fermented liquors prepared with sugar of fecula, cassonade, and vinegar, are substituted for it; every kind of it is prepared with dry fruits, or else it is prepared in vessels which render it injurious: we have seen cider containing lead give rise to more or less serious symptoms.

We have seen sold, and even in the interior of the casernes, *under the name of cider*, liquids which merited a serious attention on the part of the military authorities. By the sale of these liquids, the soldier is, in the first place, deceived in the value of the product, and is also liable to be rendered more or less dangerously ill: this so called cider contains a small quantity of a salt of copper.

14.—*Of Coffee.*

Coffee, which is a necessary morning aliment to a great number of the poorer classes, is often the subject of numerous frauds. Coffees which have been thrown into the sea are taken up, worked, and then sold in commerce with coffees of good quality. Coffee of good quality, when

ground, is adulterated with—1st, exhausted coffee, which has been collected and dried; 2nd, with powders, obtained by torrefying various products, roots of chicory, beet-root, carrot, the seeds of peas, pointed peas, rye, &c., &c. All these products are not injurious to health, but they are sold for that which they are not, and as substitutes for a product of greater value. There is no chicory which has not been the subject of fraud; this product, intended to be mixed with coffee, has been adulterated in its turn. Thus, there is sold in commerce as chiefly coffee—1st, a product resulting from a mixture of exhausted coffee and torrefied bread; 2nd, a product resulting from a mixture of chicory, coffee, and animal charcoal, arising from the decoloration of sugars, a *residue of the refineries*. We will here call to mind that, in the course of legal proceedings carried on between the Sieurs L. and D., it was proved that one of the brothers, L., a merchant, had come to Paris to collect various residues; the powder of semoule, and the residue of vermicelli, which should be dyed and mixed with chicory coffee, but that having ascertained that this product did not present the advantage which he had hoped for, he put himself in connexion with the lemonade boys, and for two months employed a man and a cart to collect all the coffee grounds which had been preserved at his request.

15.—Of Wines.

The wines sold at Paris, by retail, are, in general, wines produced by the mixture of several crude products. But this mixture is not a fraud; the fraud practised consists in mixing with the southern wines, which contain a great quantity of alcohol, water, acidulated either with vinegar or with tartaric acid; sometimes, instead of water, dry fruits, are macerated, and the liquor added, and these mixtures are colored with juices prepared with different matters, and especially with elderberries. Formerly, the wine

which became sour was saturated and sweetened with oxide of lead, litharge, according to the process of Martin le Bavarois; now this dangerous saturation is almost abandoned: we had an opportunity of noticing it, however, some years ago, at Compiègne; several soldiers of the camp were taken ill; the cause of their illness was investigated, and it was ascertained that this cause was attributable to the use of a green wine, which had been sweetened with acetate of lead; the vintner, who had bought from a druggist the acetate which he introduced into his wine, was brought before the tribunal, and convicted.

Wine is also, in some cases, mixed with alum, with the view of rendering it clearer and more limpid.*

16.—*Of Brandies.*

The brandies sold by retail are most commonly mixed with alcohol of fecula and water, the whole colored by caramel; sometimes the brandies, owing to the impurity of the alcohol, and in consequence of negligence of the distillatory vessels, contain salts of copper injurious to health.†

17.—*Of Vinegar.*

The vinegar sold at Paris is still, notwithstanding the surveillance of those who sell it by retail, mixed with foreign substances; this acid which the poor employ as a condiment in the aliments of which they make daily use, is

* It should be called to mind—1st. That some months ago, the *Sieur R.*, proceeded before the tribunals against a company against the sale of a process, by aid of which a portion of wine was doubled without increase of price. 2nd. That two musicians, dealers in wines, were condemned to three months' imprisonment, and to a fine of 200 francs by the 7th Chamber, for having manufactured with water, vinegar, southern wine, and campeachy wood, a liquid which they had sold as wine. We have just detected in wines the presence of a salt of copper, arising, in our opinion, from alcohol containing a salt of copper having been added to it.

† We have seen alcohol containing 30 centigrammes of acetate of copper to one quart of brandy.

mixed with 1st. Sulphuric acid; and this adulteration is proved every year in Paris. 2nd. With water in the proportion of one-third or one-half; in the latter case the product is not injurious to health, but then the purchaser pays 60 centimes the litre for a liquid which should cost only 30 or 40 centimes. 3rd. With water acidulated by tartaric acid; the buyer in this case is also deceived in the value of the product.

Besides the wine-vinegar sold at Paris, vinegars are manufactured in that capital *with syrup of fecula, with the washing waters of the sugar forms called waters of bac, with wine-leys, and with bacquetures collected under the counters of wine merchants.* None of these vinegars can be compared, as regards taste and acidity, with wine-vinegar. In our opinion, they should be sold only for what they are, and under the names of *vinegars of syrup of fecula, of waters of bac, of wine-leys, and of bacquetures.*

This last vinegar, the vinegar of bacquetures, most frequently contains a salt of lead; sometimes, but rarely, the presence of a salt of copper has been detected.

18.—Of Tea.

Tea is adulterated like all other substances; tea of good quality has been mixed with tea which has been used, which has been collected, and which is rolled by suitable means. Teas are colored with indigo and with prussian blue.

In August, 1844, the Administration was informed that a certain quantity of tea derived from an English ship called the *Reliance*, which had suffered shipwreck on the coast of France, was fished up again, washed with water to free it from the sea salt, then colored green by a mixture of indigo, talc, and chromate of lead, and passed into commerce.

The persons who committed that fraud were a merchant and a working man. At first the correctional police sen-

tenced them to pay a fine of 50 francs, and to be imprisoned for 8 days ; but an appeal being made, the merchant was acquitted ; the Royal Court, considering that if A. did subject the damaged tea to a treatment to render it saleable, this is no proof of any fraud with reference to the quality of the merchandize sold.

In consequence of this acquittal, the tea still covered with the chromate of lead, a poisonous salt, which might prove injurious to the animal economy, was restored to Mr. A. It is to be regretted that the Administration did not order that, previous to restoring the tea, it should be washed to remove the chromate of lead.

It is probable that tea colored with the chromate, indigo, and talc, are at present circulating in commerce. It must be remarked here, that this fraud with tea was not only practised in the metropolis, but at the moment when the tea colored by chromate of lead was the subject of an investigation at Paris, M. Merchand, pharmacien in Fécamp, found that tea sold in that town was likewise colored by the same process.*

In addition to this, we could quote a great number of other substances constituting articles of food with which more or less heavy frauds are practised ; but we think that the facts above related clearly prove the necessity of a law being enacted with reference to the sale of alimentary substances and spices—a law which would prevent not only the frauds quoted above, but those likewise which I have passed over in silence. This law would have the advantage of protecting the health, as well as the interests, of the citizens.

* At the same time when the subject was inquired into at Paris, the excise authorities in London seized upon a manufacture of sophisticated tea, one ton of which, having already been used, was worked upon. Shortly previous to that time, a tea merchant of London was sentenced to pay a fine of 200 pounds sterling. This fine did not dishearten the defrauders, which proves that this fraud must be very profitable.

Before quitting this subject, we deem it proper to inform those who may think that the existing laws are sufficient to prevent delinquencies of this kind, that this is not the case: the Article 318 of the Penal Code says:—"That whoever has sold, or offered for sale, sophisticated beverages, containing mixtures injurious to health, shall be imprisoned for the term of from six days to two years, and fined from 16 to 500 francs;" but this article does not extend to such defrauders as mixed plaster of Paris with salt; alabaster with fecula; fecula sugar with cane sugar and honey, water with vinegar, &c., &c. For they may plead—1st. That these substances are not injurious to health. 2nd. That they neither sold nor offered for sale the mixed substances found upon their premises. Is it, then, necessary for the purpose of making application of this law, to have recourse to artifices to prove the sale? We feel indignant at dealings of this kind, both in behalf of the jurisdiction and of the administration: The Article 475 of the Penal Code fines, in the sum of 16 francs, such as have sold *falsified beverages*; in this case as in the preceding one, if the falsified merchandise be seized upon the premises, the defendant will not always forfeit the fine, because he may allege that he did not sell.

The Article 423 runs as follows:—"Whoever imposes upon a purchaser with reference to the standard of articles made of gold or silver; the quality of a spurious stone sold for a fine one; the nature of any merchandise; and whoever makes use of false weights, &c., shall be sent to prison for the term of from three months to one year, and fined in a sum which may amount to one-fourth of the value.

It would appear that in no case the administration is in a position to prevent the fraud. It is known that a man sold a certain quantity of salt which is injurious to health; some salt similar to that sold is seized upon his premises: has he not a right to maintain that he did not sell this salt?

We have witnessed several times cases in which the tribunals acquitted the defaulters, regretting that the law made no provisions empowering them to inflict penalties.

Ibid.

ART. LXI.—PURIFICATION OF GUM RESINS BY MEANS OF DISTILLED WATER AND ESSENTIAL OIL OF TURPENTINE.

By M. LAMOTHE.

VARIOUS media have been successively employed for the purification of the gum-resins. Baumé recommends dissolving them in vinegar; the old French Codex substitutes white wine for vinegar; that of 1818, weak alcohol for the white wine; and in the preparation of *Empl. Conii*, it orders vinegar of squills and hemlock juice for dissolving the gum-ammoniac. The late M. Henri, in his lectures at the Pharmacie Centrale, likewise suggested weak alcohol as the best solvent; a method which has generally been adopted, and which is prescribed in the new Codex.

I confess that alcohol affords an homogeneous product well adapted for being incorporated in plasters; but if the length of time required for the operation be taken into consideration, the expense of the alcohol, which, notwithstanding the care of the operator, is for the greater part dissipated, and the quantity of the liquid requisite for dissolving completely the gum-resins, the preference will be given to the process which I have employed for sixteen years in my laboratory; a process which is less expensive, more expeditious, and affords equally good products:—

R Gum-ammoniac, or any other gum-resin,	1 part.
Distilled water,	4 parts.

Macerate for 12 hours in a tinned copper basin, agitating now and then with a wooden spatula: at the end of this time expose the mixture for some minutes to a temperature of 158° to 168° , strain through linen with slight pressure, treat the residue with a fresh quantity of distilled water and express, and subject it to a third and even to a fourth digestion, each time in 2 parts of distilled water. There remains a tenacious pitchy magma, which is exposed to a gentle heat in half a part of essential oil of turpentine and as much distilled water; the latter to dissolve the gummy portion, the former to dissolve the resin; strain with pressure. If the residue is not entirely exhausted, place it again over the fire with a fresh quantity of essential oil and water; mix all the liquids, and evaporate in the water-bath until all moisture is driven off, stirring constantly.

Chem. Gaz. from Journ. de Pharm.

ART. LXII.—ON THE PREPARATION OF THE VALERIANATE OF ZINC, AND ITS MEDICINAL EMPLOYMENT.

THE valerianate of zinc, first proposed by Prince Louis Lucien Bonaparte as a medicine of considerable value, has for some years occupied an important place in the therapeutics of the Italian physicians. Dr. F. Devay, physician to the Hotel Dieu of Lyons, has recently made numerous experiments with this substance, the remarkable results of which have excited the attention of French practitioners to a high degree; and the valerianate of zinc has all at once got into great favor, so much so that for some weeks this salt is constantly being prepared by the principal pharmacutists of Paris.

Under these circumstances, a review of what has been published relating to the valerianate of zinc will undoubtedly interest many of our readers. Valerianic acid, discovered by Planche, was isolated by Grote, and was investigated by Penz. It pre-exists in the root of valerian, but it may likewise be readily produced by acting with caustic potash on potato fusel oil. It is a volatile fat acid, colorless, soluble in every proportion in alcohol and æther, and soluble in about 30 times its weight of water. To obtain it, the valerian root is distilled until the product has no longer an acid reaction; the essential oil which floats on the surface of the distilled water is separated, and the acid which it retains removed by shaking it with solution of caustic potash; the distilled water is saturated with carbonate of potash, the liquids mixed, and then evaporated to dryness at a very gentle heat; the residue, introduced into a retort and distilled with a suitable proportion of dilute sulphuric acid, affords a saturated aqueous solution of valerianic acid, on which some pure valerianic acid floats. Two pounds of valerian root afford about 2 grms. of acid.

To convert it into valerianate of zinc, it is saturated with the carbonate, or still better with perfectly pure oxide of zinc recently precipitated. The action is assisted by heat, the hot solution filtered and allowed to crystallize on a gently heated sand-bath. The crystals form light nacreous laminæ of a brilliant white colour. According to M. Duclos, cold water dissolves one-fiftieth of its weight and boiling water one-fortieth. It is scarcely soluble in æther, but 100 parts of boiling alcohol dissolve 6 parts.

Valerianate of zinc was recommended as an antispasmodic, and the experiments of Dr. Devay were undertaken to determine its value as such. The results which he obtained have been remarkable from the quickness and completeness of the cures. The physiological effects are scarcely more decided than those of the valerian or of the zinc taken separately. A dose of $2\frac{1}{2}$ grs., which is sufficient to subdue

an attack of neuralgia or moderate the paroxysm of a violent megrim, produces in the healthy state but a little cephalalgia, slight vertigo, and a little confusion of hearing. It is particularly in the case of tic-douloureux, which cannot be subdued by the ordinary antispasmodics, that Dr. Devay has confirmed the efficacy of the valerianate of zinc; he has likewise applied it with success to the treatment of some other analogous affections, such as nervous headache, violent megrim, satyriasis, &c.

The following are the different forms in which he prescribes this remedy:—

Pills.—Valerianate of zinc,	9 grs.
Gum-tragacanth,	30 grs.

Make into 12 pills, one to be taken in the morning and one in the evening.

Powder.—Pulverized valerianate of zinc,	9 grs.
“ sugar,	45 grs.

Mix, and divide into 24 packets, of which from 1 to 4 should be given daily according to circumstances.

Draught.—Distilled water,	5 drms. 20 drops.
Valerianate of zinc,	1½ gr.
Simple syrup,	1 oz.

A spoonful every half hour.

Ibid., from Ibid.

ART. LXIII.—ON A NEW METHOD OF PREPARING IODIDE OF POTASSIUM. By R. PHILLIPS, Jun.

IN examining six samples of iodide of potassium, procured at different chemists, the author found that No. 1 was strongly alkaline, and contained water, iodate of potash and chloride of potassium or sodium; No. 2 resembled No. 1, except that it contained a larger quantity of iodate; No. 3 was slightly alkaline, contained no water, but a trace of an iodate and chloride; No. 4 resembled No. 1; No. 5 was almost pure, containing only a trace of iodate and water; No. 6 resembled No. 1. The author proposes the decomposition of the iodide with nitrate of silver, washing the precipitate with distilled water, and then digestion in strong solution of ammonia, as a readier and better process for detecting the adulteration with a chloride than the method in general use. If the filtered ammoniacal solution, acidified with nitric acid, give a white precipitate, it is chloride of silver, and denotes the presence of a chloride of potassium and sodium. In testing for iodate of potash, the solution of the iodide in cold distilled water is to be acidulated with tartaric acid, and a solution of starch added; if the mixture does not become of a dark color, no iodate is present.

The author's process consists in decomposing the iodate of potash formed by the action of iodine on potash by protoxide of iron. The usual method, viz., fusion of the iodide so as to decompose the iodate, is objectionable, because a heat which is sufficient to decompose the iodate renders the iodide volatile. The protoxide of iron is easily prepared by precipitation with the alkalies from the protosulphate of iron. The precipitate must be washed by decantation, until chloride of barium causes no precipitate in the water. Peroxide of iron being a sesquioxide, it is necessary, in

order that the whole of the iodate may be decomposed, that for every atom of carbonate of potash used, there should be present 2 atoms of protoxide of iron. The quantities therefore should be 2 atoms or 280 parts of protosulphate of iron, which are to yield 2 atoms of protoxide, 1 atom or 125 parts of iodine, and 1 atom or 83.5 parts of carbonate of potash. On account, however, of the liability of the protoxide of iron to become peroxidized, it is better to take rather more of the protosulphate.

The protoxide, when washed, is to be mixed with the iodine and carbonate of potash, half a pint of water being used to an ounce of iodine. The mixture is at first to be gradually heated, and then boiled for half an hour. The solution afterwards ought to be exactly neutral to slightly redden litmus-paper; if iodine be in excess, more carbonate of potash must be added; if, on the contrary, it is alkaline, more protoxide of iron and iodine. The sesquioxide of iron remaining, after being well washed, may be heated red-hot for a few minutes; a beautifully pure preparation remains, which on account of its easy solubility in hydrochloric acid might be advantageously used in the preparation of the *Tr. Ferri Muriatis*.

Ibid., from Ibid.

ART. LXIV.—ON THE PRESENCE OF LEAD IN THE STATE OF OXIDE OR SALT IN VARIOUS ARTIFICIAL PRODUCTS.

BY M. CHEVREUL.

I AM induced by several motives to publish some facts with reference to the presence of lead in the state of oxide or salt in various products of the arts, not because these facts of themselves are of great importance, but, on account of the many consequences which may be deduced from their knowledge, they present a certain interest.

I have had an opportunity afforded to me of pointing out to the Academy the inconvenience which may occur from treating woollen tissues with metallic matters, susceptible of producing with the sulphur which they naturally contain colored sulphurets, when these tissues are either to receive impressions on a white or light-colored ground, or to be dyed by similar colors, because under the influence of the heat or steam, or of the liquid serving as a dye bath, a colored sulphuret is formed spreading over all the portions of the tissues which are impregnated with the metallic matter. Some months back I was asked what might be the reason that the shawls woven in Picardy six months ago, on coming into contact with steam, became of a brown tint, even without having received any previous preparation. I soon found that the warp alone was colored, and as this was treated with isinglass, it appeared to me that the metallic matter was employed in the latter substance. Experiment confirmed my anticipation, for I discovered oxide of lead and a very little oxide of copper, not only in the sizing in the state in which it was employed, but likewise in the size itself from which this was prepared.

The proportion of the oxide of lead was so great, that the water in which the size was dissolved became strongly

colored by sulphuretted hydrogen. I succeeded in obtaining the lead in its metallic state from the incinerated matter. After this experiment I learned that the size was prepared in the environs of Lille, and that ceruse had been added to it; fortunately, it was not of a nature to be employed as an alimentary substance. The communication, however, of this fact is interesting to manufacturers of woollen tissues, and with the view to be useful to them I thought it proper to give it all possible publicity.

Some years ago I was asked by a laundress of Sèvres (Madame P——) whence came the brown stains which appeared when she washed, for the first time, shirts, handkerchiefs, &c., made of cotton cloth. The loss which she suffered by several accidents of the kind induced her to find out the cause of them, and she discovered that these cloths came from one of the first manufactories in France, the Parisian agent of which was one of her customers. She sent to me a specimen of some new cloth, together with some of the alkaline matter, employed by her as ley, and which she obtained at La Villette. I recognised the presence of sulphate of lead in the dressing of the cloth; and, finally, having found that this alkaline matter was a mixture of highly-sulphuretted soda, potassa and lime, I no longer doubted that the stains were produced by a reaction of the alkaline sulphurets on the sulphate of lead contained in the dressing. Without entering here into the question, how far cloth, impregnated with sulphate of lead, may be injurious to health, we think that the process of giving body and firmness to cloth by mixing sulphate of lead with the dressing ought by all means to be prohibited; and this is the more practicable, since, at present, for this purpose, in many establishments, sulphate of lime is employed without inconvenience.

I will make some remarks with reference to the investigation of metallic matters in human and animal bodies. In speaking of the boiling of the Dutch company (Compagnie

Hollandaise,) I quoted the experiments, from which it appeared to me that the copper which analysis may discover in animals or plants, is not to be considered as an essential element of their constitution. The quantity of this metal, though always very small, is variable, being sometimes altogether absent. If a cupreous salt penetrates the soil of vegetables by means of water, or a similar salt or cupreous powder penetrates with the food, or in any manner whatever the body of animals or of man, I consider this penetration as an accidental one. This is in conformity with the views expressed in my treatise on "*Matter considered as it exists in Living Beings*," in which I distinguished three classes of immediate principles—principles essential to the existence of beings; principles which, though necessary, are not essential, so that, if they are absent, others may supply their place, finally, accidental principles which, without inconvenience, may be absolutely absent. I placed lead and copper among the accidental principles of the organised beings.

I will now make some remarks with reference to the presence of this metal, deduced from analyses made under a circumstance of which I am about to speak. Having put some cloth, silk and wool, to be used in the demonstration of my course, (delivered last year at the Gobelins,) in water rendered alkaline, it was noticed with astonishment that the wool became brown in waters containing soda, baryta, strontia and lime, which were prepared for my experiments with perfectly pure alkali. I soon recognised the action of the oxide of lead under the influence of the alkali and sulphur of the wool, by the coloration of this latter body. But whence came the oxide which I found in the alkaline waters on treating them with sulphuretted hydrogen? It came from the flasks in which these waters were kept during several months, and it was evident that the glass of these flasks was a mixture of glass, properly so-called, and of *lead-glass*, called crystal. In the year 1828, I pointed out

the error to which crystal glass might lead in legal cases, in treating, as was then usual, matters suspected to contain arsenic with carbonaceous matters in glass tubes containing oxide of lead. (*Vide* my letter addressed to M. Lefrançois-Lalande, printed in a memoir of M. Guerre, Advocate at Lyons, for the defence of Mde. D. indicted for parricide.) The same fact, I mean the existence of oxide of lead in glass, might lead to an erroneous result, not only in medico-legal investigations, but in any research whatever. Hence, to obviate any possible error, I call to mind the discussion raised by several chemists, with reference to the presence of oxide of lead in reagents, and especially in potassa prepared by alcohol.

According to M. Dupasquier, of Lyons, known to the Academy by his interesting labors in several branches of chemistry, the potassa prepared with Alcohol, as sold by the manufacturers of chemical products at Paris, contains oxide of lead. According to M. Louyet, of Brussels, who investigated the absorption of deleterious substances by plants, the potassa prepared by alcohol by the firm of Robiquet, Boyveau, and Pelletier, is entirely free from them, containing, however, small quantities of alum, silica, and platinum.

Without pretending to obtrude myself as an arbitrator between MM. Dupasquier and Louyet, it evidently results from my own observations that alkalis, potassa, soda, baryta, strontia, and lime, though deprived of oxide of lead, on being kept dissolved in flasks of glass, containing lead, may dissolve a notable quantity of this oxide.

Finally, on terminating this note, I consider it useful to quote the following passage, extracted from a report laid before the Academy :—

“The frequent use made in our days of several poisonous compounds, as those of arsenic, copper, &c. &c., must excite our attention,” for it is possible, for instance, that waters which have served to wash substances impregnated with arsenical compounds, might in some places have a pernicious

influence on animals. It is possible that the same effect might be produced by matters containing arsenic, which having been buried, and then disseminated by subterraneous waters, might be brought back again to the surface of the soil, at a distance from the place in which they were deposited."

The report in which the above passage is to be met with, was made by myself the 11th and 18th March, 1839, and the same year, being just then published, I read in the memoirs of the Royal Society of Sciences, Letters, and Arts of Nancy, for the year 1838, a note of M. Braconnot, superscribed, "On a circumstance which may cause error in the detection of arsenic."

Here follows the first part of this note :—"For about thirty years, during which a manufacturer of colored paper has prepared his colors with various mineral substances, several families living in the house adjoining his establishment have experienced in succession, with more or less intensity, the following symptoms :—headache, lassitude, nausea, painful digestion, almost continued colics, alvine dejections, swelling of the legs, discomfiture, and loss of spirits; in consequence of which affections, several members of these families died. Two years ago, new victims having suffered, a suspicion was raised that the water of the wells might contain some of the poisonous substances employed in the manufacture, but in the investigation which we then made, nothing was discovered, and the present inhabitants of this house continue to make use of the same water; they even sensibly recovered, but the above-mentioned symptoms manifested themselves with so much violence, that the case evidently appeared to be one of poisoning. M. Simonin and I were requested again to examine the water of this well, we then easily discovered the presence of arsenic associated with an alkali, alum, and a coloring matter."

M. Braconnot terminates his note by "earnestly inviting

the authorities charged with the public health, to superintend, with the greatest attention, manufactures of this kind."

Had I had any knowledge of the note of M. Braconnot at the time when I compiled the above quoted report, I should certainly not have failed to mention it as a most strongly corroborative proof of the statements in the passage quoted above.

Conclusions.

1st. It is evident that woollen tissues should not be put into contact with materials containing lead or copper, when they are destined to be exposed to steam or hot water, to preserve a white ground, or to receive light colors.

2nd. Woollen tissues, or size, which served for the sizing of their warp, and cloth tissues dressed with a preparation of lead, which gave rise to the phenomena signalled in the above note, on being subjected to the test of liquid sulphuretted hydrogen, which I proposed some years since, produce a striking coloration, and this agent, consequently, is qualified to obviate all the inconveniences which might result from the presence of oxide of lead.

3rd. In future, in all chemical or medico-legal researches in which the subject of investigation is lead or its compounds, it will, above all, be indispensable to subject the alkaline reagents to the proper experiments, to ascertain whether these latter bodies are free from oxide of lead, and whether they have received none from the glass vessels in which their solutions may have been put.—*The Chemist.*

MINUTES OF THE PHARMACEUTICAL MEETINGS.

April 1st, 1844.

Professor CARSON in the Chair.

The minutes of the preceding meeting were read and adopted.

A communication from John H. Ecky, on "the Extract of Seneka and Squill," containing instructions as to the mode of preparing Compound Honey of Squill with it, was read and referred to Charles Ellis and Thomas P. James for examination.

An interesting discussion ensued relative to the several merits of honey and sugar in the preparation called Coxe's Hive Syrup, the Syrupus Scillæ Compositus of the U. S. P.

Professor Carson communicated some information relative to the "Matico" brought from Valparaiso. It possesses astringent and styptic properties.

May 6th, 1844.

Professor CARSON in the Chair.

The last minutes were read and adopted.

The Committee having in charge the paper of John H. Ecky, presented a report, which after consideration was returned to the committee for further action.

Professor Carson exhibited a specimen supposed to be genuine Socotrine Aloes of very fine quality; also an article obtained in Boston by Charles Ellis, under the name of "Gum Aceroides," the origin and nature of which are undetermined.

Edward Wayne exhibited several specimens of Copaiba which had been adulterated, as was supposed, with Venice turpentine; also a crystalline substance which had separated from Ol. Monardæ Punctatæ, obtained by distillation. The same member presented a specimen of Honey Locust,

(*Ceratenia siliqua*,) directed in the Prussian Pharmacopœia as an addition to *Syrupus Papaveris*.

December 2d, 1844.

CHARLES ELLIS, Vice President, in the Chair.

The preceding minutes were read and adopted.

The committee having in charge the paper of John H. Ecky, informed the meeting that they were not yet ready to report, the author having undertaken to re-examine the subject.

William Procter, Jr., presented specimens of the fruits of *Bixa orellana*, *Asclepias gigantea* and *morinda*, from Cienfuegos in Cuba, whence they were brought by J. G. Howard, Esq.

Charles Ellis called the attention of the meeting to the subject of fluid extract of senna, and exhibited a specimen of the preparation, in form a little less concentrated than that usually sold, one fluid ounce and a half, representing an ounce of Alexandria Senna. He stated, that from various sources he had heard complaints of the products furnished by the process published in the *Amer. Journ. Pharm.*, vol. xiii. p. 290, and he suggested whether the difficulty did not arise from the protracted heat necessary to effect the great degree of concentration to which the preparation was carried. Other members objected to the formula because of the impossibility of getting water to pass through after diluted alcohol, when the senna is well bruised. On comparing notes, it was found that some members employed India senna, and some the Alexandrian article, which was thought by Charles Ellis to account for the variableness before spoken of, he being decidedly of the opinion that the former is less active than the latter. In order to ascertain if this opinion be correct, William Procter, Jr., engaged to have extracts made with equal care from both kinds of senna, fairly tested in their cathartic power, and report at the next meeting, which was agreed to.

Then adjourned.

January 6th, 1845.

Professor BRIDGES in the Chair.

The minutes of the preceding meeting were read and adopted.

Reports of committees being in order, Charles Ellis on behalf of the committee appointed to consider the paper of John H. Ecky, read a communication from that gentleman detailing a careful repetition of his experiments, which has fully corroborated his first statements. On motion, it was agreed, that the original paper be published, with such additional remarks, as, in his last observations, the author intended to offer—and that the committee be discharged.

Prof. Carson read a paper on Matico, prepared by James L. Elliot, which was referred to William Procter, Jr., Ambrose Smith and A. J. Duhamel as reporters.

Prof. Carson informed the meeting that Matico had been employed in this city, and subsequently at the Naval Asylum at New York, with marked success, as an injection in mucous discharges; and that its *modus operandi* was peculiar. It possesses anti-hæmorrhagic powers. It is the product of the *Piper angustifolia*.

William Procter, Jr., in accordance with his engagement at the previous meeting, informed the members that he had prepared carefully an extract from each variety of senna, the only difference between them being, that the Alexandrian article was without aromatics, whilst the Indian had associated a small quantity of the oils of fennel and anise, each fluid ounce of extract representing an avoirdupois ounce of senna. Having provided the preparations, the next step was to get them fairly tested as to cathartic power, which was happily effected through the obliging attention of James N. Marks, the able pharmacist attached to the Philadelphia Hospital at Blockley, who reported as follows, viz.

CASE 1. 12mo. 16.—Wm. Murray, aged 48 years, at 1½

o'clock, P. M., took ʒvj. fluid Ext. *India* Senna, purged four times, at 7 and 10 o'clock evening, freely, and at 3 and 7 o'clock, morning, moderately.

12mo. 31.—Administered ʒvj. Ext. *Alex.* Senna at 7 o'clock, morning, purged *five* times—at 12½, 1, 2, 7 o'clock, noon, and again at 7 in the morning of the 1st of January; states it purged much more actively than the first.

CASE 2. 12mo. 16.—Jonathan Tucker, aged 68 years, at 2½ o'clock, P. M., took ʒvj. fluid Ext. *India* Senna, purged *four* times—at 7, 9 and 9½ o'clock, evening, and at 7 o'clock on the morning of 17th.

12mo. 30.—Administered ʒvj. Ext. *Alex.* Senna at 2 o'clock, P. M., purged freely, *five* times, at 7, 7½, 8, 8½ and 9 o'clock; says it operated more actively than the Ext. of *India* Senna.

CASE 3. 12mo. 23.—Jas. McGovern, aged 59, at 1 o'clock, P. M., took ʒvj. Ext. *India* Senna, purged *three* times, at 9 o'clock, evening, and 2 and 7 in morning of 24th; first operation large.

12mo. 30.—Administered ʒvj. Ext. *Alex.* Senna at 2 o'clock, P. M., purged *four* times, at 8 and 10 in evening, and 1 and 7 on morning of 31st, all large; states it purged much more freely than the first.

CASE 4. 12mo. 23.—John Murphy, aged 40, at 1 o'clock, P. M. took ʒvj. of Ext. *India.* Senna; purged well, *three* times, at 7 and 8 o'clock, evening, and 6 o'clock on morning of 24th.

12mo. 30.—Administered ʒvj. Ext. *Alex.* Senna; at 2, P. M. purged *four* times, all full, operations at 8 and 9, evening, and 1 and 7 o'clock on morning of 31st; says it purged him much more actively than the first, or *India* Senna purge.

CASE 5. 12mo. 23.—John S. Kelley, aged 35 years, took at 1 o'clock, P. M. ʒvj. Ext. *India* Senna; purged *four* times, at 7, 8 and 8½ o'clock, evening, and 6 o'clock

on morning of 24th; first and second operations large, last two small.

12mo. 30.—Administered ʒvj. Ext. *Alex.* Senna at 2 o'clock, P. M.; purged very hard *five* times, at 7½, 8, 8½ and 12, night, and at 7 on morning of 31st; states the last purge to be much more powerful than the first.

From these observations, it appears conclusive that the Alexandrian variety possesses an activity superior to the Indian, and in making preparations where the quantity of senna is fixed, that the former should be employed.

In connection with this subject Professor Carson remarked that Dr. R. E. Griffith had informed him, that the leaflets of the *Cassia marilandica* when collected in the fall, before frost, when they are beginning to turn yellow, are much more active and have much more purgative power than those removed in the flowering season, when they are deep green; and he thought that a variation in the period of gathering might account for the difference in the activity of different samples of senna.

Professor Carson presented a specimen, said to be Virgin Scammony, imported from England by Mr. Rushton of New York, which, as a rare article in our market, was referred to Charles Ellis and Edward Parrish for examination.

William Procter, Jr., exhibited a specimen of Valerianate of Zinc, which he had prepared by saturating the water, and the accompanying oil, distilled from Valerian with hydrated carbonate of zinc, filtering, evaporating till a pellicle forms, and setting aside to crystallize. The specimen had a brownish color from its not having been recrystallized, to remove the coloring matter.

William Procter, Jr., called the attention of the members to an idea which he had carried into practice, and which was a sort of combination of maceration and displacement. It was not offered as original, as the same principle had been some years since presented in a plan of making infusions, by Robert Alsop of London, (see *Amer. Journ. Pharm.*, vol. 8,

page 89,) and is also noticed by Soubeiran, (*Traité de Pharm.*, tome 1st, page 72.) It consists in suspending the substance to be exhausted on a porous diaphragm or sieve, near the surface of the menstruum, where, as the particles of fluid in contact with the substance get saturated and consequently heavier, they sink and are replaced by fresh portions, thus producing a circulatory process in the menstruum, which continues until either the substance is exhausted or the fluid saturated.

This plan of operation is occasionally eligible, particularly where the quantity of menstruum is large compared with the bulk of the ingredient to be exhausted. It is peculiarly applicable in effecting the solution of soluble saline matter, as in preparing the solutions for Vallet's proto-carbonate of iron, when haste is not required, and in removing soluble crystalline deposits from bottles by filling them with water and inverting them in the same fluid.

MISCELLANY.

Ammonia in the manufacture of Starch, and Farinaceous matters. By JOSEPH NASH.—I take the liberty to request your publication of the following discovery, which I have made, about three years since, and which I conceive will be found very useful to the public:—

In some experiments which I made on the process of making starch, and preparing farinaceous matters for purposes of food, I found that, for all the purposes of practical operation, liquid ammonia is the best agent for the purpose of dissolving gluten coloring and astringent matters, leaving only the fibre and the starch unchanged, and which, after washing two or three times, may be easily separated by the usual process of straining through a fine sieve, and drying as usually practised. The best degree of strength for use is sp gr. 0.965, and it is superior to caustic soda or potash, as strong solutions of them act powerfully on the starch, while the ammonia produces no change in it, however long it may be kept in operation. It may be applied also in the gaseous way, by passing the ammoniacal gas through refrigeratory apparatus into vessels containing any kind of farinaceous matters, such as wheat, rice, peas, bruised potatoes, or such like matters; and in this case the ammonia from gas-liquors may be used by adding lime and distilling the vapors from them, as it is not necessary to use a perfectly pure ammonia for all the purposes of making starch; but the ammonia may be obtained from any known source. The ammonia, when saturated with gluten, may be obtained again by distillation, and used over again, and the gluten may then be applied to purposes of food, or any other purpose to which it may be found applicable; as an improvement in food it will be found highly useful, as the inferior kinds of rice, peas, and such like matter, after being steeped in ammonia for a few hours, and then well washed, will be found equal to those of the best quality. Close vessels are the best for conducting the operation, and in some cases a low degree of heat may be used without any injury, but it is not absolutely necessary, as the cold operation is sufficient for all practical purposes.

It is also an improvement to add a little ammonia to starch as a finishing process, however the starch may have been obtained, whether by the usual process of fermentation or by the use of dilute solutions of

soda or potash, as it prevents the possibility of fermentation while in a damp state, and dries more rapidly.

P. S. Ammonia will be found preferable to potash or soda in removing glutinous matter from vegetable fibre, for the purposes of woven fabrics, or other manufactures.—*Chemist*.

On the dosing of Iodide of Potassium. By A. DUVILLE.—Six months ago I was witness of a fact which proves the high dose in which iodide of potassium may be employed.

If this note appears to you at all interesting to the practice of pharmacy, I beg you to communicate it to the Society (of Pharmacy) of which I have the honor to be one of the corresponding members, and to cause it to be inserted in the Journal which it publishes with so much impartiality.

Towards the end of 1843 I was charged with preparing, for a patient attacked with a venereal bubo in the left groin, an ointment thus composed :—

Iodide of potassium	-	-	-	-	16
Lard	-*	-	-	-	30

This ointment was made according to the Codex, bruised on porphyry. It was to be employed in frictions, three times a day, and at the same time the patient had to swallow, also three times a day, lumps of the size of a nut of an antibleorrhagic opiate composed of balsam of copaiba, cubebs and caustic magnesia (to solidify the copaiba.)

By a mistake, which might have been fatal to him, but which will easily be understood, when it is known that the patient was compelled, for certain reasons, to follow up the above treatment secretly, the first friction having to be made at night, he did it in the dark, and used for this purpose the astringent opiate; immediately after he swallowed (I know not how he could have done it) a lump of the ointment prescribed of the size of a muscovado nut. He continued the same mode of treatment, and always in the same error, until the two pots were finished. In this case he did as many patients do, who, in such cases, often exceed the limits of the prescription, in the hope of being more speedily cured, and took the whole in forty-eight hours, (46 grammes of ointment and 64 of astringent opiate employed in frictions.)

Great was my surprise when, after the error noticed, he told me that the bubo had changed its place, and that it was now situated in the middle of the thigh.

I leave physicians to decide whether this is possible, and whether the

patient was really affected with a syphilitic bubo or with a gland of quite another nature.

The fact is, that a new quantity of the ointment, made in the same proportions, but employed this time as it should have been in the first instance, caused this singular tumor to disappear in a few days. When I saw it in the middle of the thigh, it rolled under pressure of the fingers. He assured me that he had not perceived any pain in the epigastrium, nor in other parts of the digestive tube, only he must have had a great desire to be cured, to *masticate*, in some measure, this fat, for which he has since retained a horrible disgust. The opiate, on its part, had caused him to suffer much, by producing the effect of a vesicatory incessantly irritated by rubbing with a cloth, in the angle of the abdomen and the commencement of the thigh.

To sum up: Can 16 grammes of pure iodide of potassium be absorbed by an adult in forty-eight hours, without any accident resulting? This is not my opinion. Then, in this case, however exceptional, was not the fatty body employed in the preparation of the ointment opposed to the entire absorption of the iodide? Did it not form with the gastric juice an emulsion which would pass intact into the chyloferous vessels? Finally, was the deleterious action of medicine averted by a particular cause?

It is for physicians to solve the question already so often put, whether iodide of potassium may be employed in very large doses without danger.

In therapeutics, this medicine is very valuable, and it would be desirable to fix the quantity in which it may be employed.—*Ibid.*

Camphorated Saponaceous Spirit, or Liquid Opodeldoc. By GISEKE, of Eisleben.—For several years, this spirit has not only been prescribed by the physicians of Eisleben, under the name of liquid opodeldoc, but it has also been in public demand more frequently than the ordinary solid opodeldoc. It justly deserves to be preferred to the latter, because it is better preserved than in the flasks which contain it, and because it is more easily applied; it may also be more easily associated with other preparations when necessary. The following is the mode of preparing it:—

R White and dry castile soap	-	-	-	60
Camphor	-	-	-	15
Highly rectified spirit of wine	-	-	-	500
Volatile oil of thyme	-	-	-	4
Volatile oil of rosemary	-	-	-	3
Liquid caustic ammonia	-	-	-	30
Mix and dissolve S. A., then filter.				

Ibid. from Archiv. der Pharmacie.

Ointment of Mercury and Belladonna. By Dr. MIGNOT.

R—Double mercurial ointment	-	-	-	30
Extract of belladonna	-	-	-	4
Aqueous extract of opium	-	-	-	1
Liquid balsam of Peru	-	-	-	q.s.

Mix and F. S. A. an ointment of ordinary consistence, and perfectly homogeneous.

This preparation is indicated in cases of hæmorrhoidal tumors, whose pains it calms with much success.

More or less numerous applications are made according to the cases.

The dose in which it should be employed necessarily varies according to the size of the tumors, on the surface of which it should be applied.—*Ibid*, from *Jour. de Chim. Med.*

On a Method of Constructing a Simple Hydrometer. By EDWARD THOMPSON, Agent of the College of Chemistry, Otley.—Chemists have frequently occasion to determine the specific gravity of a liquid when they have not access to an accurate balance and specific gravity bottle, and druggists may often find it convenient to be acquainted with a cheap substitute for an instrument which, as ordinarily purchased, is either expensive or extremely inaccurate. I think the simple contrivance which I am about to describe, may be found useful under such circumstances. The scientific reader will perceive that it is a modification of an instrument proposed long ago by Fahrenheit:—

Choose a light cylindrical four-ounce phial, and make a mark with a file or diamond completely round the lower part of the neck. Fit it with a bung which extends considerably over the neck of the phial, and which is scooped out on the upper surface in the form of a cup. Then introduce into the phial so much shot or pieces of metal as will float the instrument up to the mark in distilled water, at the temperature of 60°, when a weight of about 500 grains is placed in the cork cup. Now, ascertain the weight of the instrument, including the phial, shot, and cork, and it is complete. When the specific gravity of a liquid is to be ascertained, pour out the liquid into a vessel sufficiently capacious to float the hydrometer, and add weights to the cup until the surface of the liquid exactly coincides with the mark. The specific gravity may then be found by the following proportion:—

As the weight of the hydrometer, added to the weight required to sink it to the mark in distilled water—

Is to 1,000:—

So is the weight of the instrument added to the weight required to sink it to the mark in any given liquid—

To the specific gravity of that liquid.

For example: Supposing that the hydrometer weighs 2,091 grains, that it is necessary to add 431 grains, to sink it to the mark in distilled water, and that when immersed in a certain spirit of wine, 27 grains are sufficient for that purpose; then $2091 + 431 = 2522$ and $2091 + 27 = 2118$. Now as $2522 : 1000 :: 2118 : 839$, the specific gravity of spirit.

It is evident that the operation of weighing the instrument and floating it in distilled water, when once accurately performed, need not be repeated, and that afterwards this hydrometer may be used where an accurate balance cannot be obtained.

In Dr. Christison's valuable "Dispensatory," Art. Alcohol, there is a table, by means of which, if it were accurate, we might readily convert the specific gravity, as obtained by this and other instruments, into degrees of Sykes and Dicus's hydrometer, as used by the Excise. But from some experiments I have made, I am led to conclude that the table is not accurate. It is but just to Dr. Christison to observe, that he does not vouch for its correctness, but only introduces it as probably more correct than another which he mentions.—*Ibid.*

On Commercial Powdered Liquorice Root. By M. INGENOHL.—Of late there frequently occur in commerce powdered drugs, which are manufactured on a large scale in Holland and England; at first sight they seem from their external appearance to be very excellent. M. Wichmann recently called attention to a liquorice powder, which has become an object of commerce under the name of *Flores liquiritiæ*, which was adulterated with Dutch pink.

Some time ago I had an opportunity of convincing myself that the liquorice powder of commerce frequently contains a quantity of starch, and that on sifting it, small, tolerably hard granules remain behind, which swell in water and partially dissolve. Both the solution, as well as the swollen granules, are coloured indigo-blue by iodine water, which together with their physical appearance, proves them to be sago.

Having read the above remark of M. Wichmann, I tested the same powder, which had been adulterated with starch, with muriatic acid for Dutch pink, and in fact it effervesced strongly, and the solution contained alumina and lime.

Such powdered drugs are frequently adulterated and impure, and should not be allowed to circulate in commerce.—*Chem. Gaz. from Arch. der. Pharm.*

Gowland's Liquor.—The liquid of Gowland is used against prurigo. The receipt books have published methods of preparing it which cannot be brought about. M. Foy gives the following formula by which a liquid is obtained, which remains perfectly white, homogeneous, and may stand at least twelve to fifteen hours without becoming opalescent:—

R—Emul. of bitter almonds,	-	-	200 grammes.
Corrosive sublimate,	-	-	1 “
Sal ammoniac,	-	-	1 “

Chemist, from Journ. de Pharm.

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